DEPARTMENT OF
INFRASTRUCTURE, PLANNING AND LOGISTICS

ALICE SPRINGS REGION

FLOOD MITIGATION ADVISORY COMMITTEE REPORT

NORTHERN TERRITORY GOVERNMENT

DEPARTMENT OF INFRASTRUCTURE, PLANNING AND LOGISTICS

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ALICE SPRINGS
Committee Membership

Front row, right to left: Mayor Damien Ryan, Russell Lynch.
Back row, right to left: Michael Sitzler, Jimmy Cocking, Rod Cramer, Ken Lechleitner.

- **MAYOR DAMIEN RYAN,** Chair
- **RUSSELL LYNCH,** Resident
- **MICHAEL SITZLER,** Business Owner
- **JIMMY COCKING,** Arid Lands Environment Centre
- **ROD CRAMER,** Rural Area Association
- **KEN LECHLEITNER,** Lhere Artepe Aboriginal Corporation

FOREWORD

Alice Springs is a regional town with a culturally diverse population and relaxed lifestyle with economic drivers including tourism, government services, mining and pastoralism. It is a town that is mostly built on a floodplain, with the CBD adjacent to the Todd River. The Todd is usually a dry river bed but when wet weather does occur in the catchment north of town it can cause substantial flooding, posing a significant risk for residents and business owners.

On 26 February 2016, the Alice Springs Flood Mitigation Advisory Committee was established and tasked with developing a strategy for flood mitigation to improve community safety, as well as reducing damage, disruption and costs associated with major flood events in the Alice Springs Region.

This report provides a policy framework for managing the flood risk in the Alice Springs Region and is committed to reducing this risk through specific recommendations and measures.

The Alice Springs Flood Mitigation Advisory Committee recognises that an integrated approach, with Government, the community, local council and other stakeholders working together, is crucial to achieve sustainable flood mitigation now and into the future.

Damien Ryan
CHAIR
Alice Springs Flood Mitigation Advisory Committee

DEFINITIONS

TERM / ACRONYM	MEANING
Annual Exceedance Probability (AEP)	The chance of a flood of a given size occurring in any one year, usually expressed as a percentage. 1% AEP flood is a term used to define a flood event that has a 1% chance to occur in a given year and is a flood of a larger magnitude.
Flood	A natural phenomenon that occurs when water covers land that is usually dry. Sources of flooding include rivers and other watercourses, local overland flow paths and groundwater systems.
Floodplain	The area adjacent to a river or creek that is inundated by flood waters and which covers an extent related to the magnitude of the flood.
DIPL	Department of Infrastructure, Planning and Logistics
DENR	Department of Environment and Natural Resources
NTES	Northern Territory Emergency Services
ASTC	Alice Springs Town Council

Flooded footbridge, Alice Springs, 1988 flood

OVERVIEW

This report provides an overarching flood mitigation strategy for the mitigation of flood risk and the impact of flood events in the Alice Springs region. Expert advice was provided to the Committee from the Department of Infrastructure, Planning and Logistics (DIPL), the Department of Environment and Natural Resources (DENR), Northern Territory Emergency Services (NTES), Alice Springs Town Council (ASTC) and WRM Water & Environment to assist in the drafting of this report.

To develop a sustainable flood mitigation strategy for Alice Springs, the Committee, consisting of long term Alice Springs residents, commenced its planning around the fundamental reality that due to the specific circumstances of the town, it is not possible to remove the flood risk for all those within the flood zone against the most severe flood events.

In coming to its recommendations, the Committee reviewed previous proposed mitigation reports and measures, including the “Dam Solution”. The Committee determined not to pursue this as a possible solution due to a number of factors including, cost versus benefit information available at the time, actual effectiveness in practice, cultural considerations, community feedback and the risk/ likelihood of it being progressed.

The Committee determined that a more sustainable flood mitigation strategy would most likely involve a series of measures that would continuously improve the protection level of flood immunity for the Alice Springs community.

The ultimate response is a mix of measures that provides a holistic approach to floodplain management and in particular addresses the ability for the town to recover as quickly as possible after a flood event.

In the development of a flood mitigation strategy for Alice Springs, the Committee has given consideration that the recommended measures when implemented are anticipated to have a positive response in the insurance market, where insurance premiums are priced using a risk-based model.

In the long term, measures such as land use and planning controls can assist in causing the highest risk properties to either relocate outside of the flood zone or effect a change in use of these properties.

Recommendations in this report are within the context of a flood risk management framework and tailored to address the unique circumstances of the Alice Springs region. These recommendations address immediate, short, medium and long term measures that are designed to improve community safety, as well as reduce the risk of damage, disruption and costs associated with flood events. A summary of the recommendations is provided in the following section and are further expanded in the body of this report.

The recommendations intend to inform the Northern Territory Government of a package of flood mitigation works with a total capital cost of $155 million over the medium to longer (10 years) time frame.

SUMMARY OF RECOMMENDATIONS

1. PRELIMINARY INVESTIGATIONS

RECOMMENDATION 1.1

Detailed topographic data to be acquired for the upstream catchments of the Todd River to allow further investigation of potential mitigation options to reduce the peak flow of a flood. Investigations to include the subsequent reduction in the impact of flooding to the Alice Springs Regions, including rural areas further west impacted by Roe Creek.

RECOMMENDATION 1.2

Undertake an assessment of all existing trunk (major) drainage infrastructure to identify works, upgrades or maintenance regimes required to the drainage system to reduce the impact and/or frequency of localised stormwater flooding.

2. STRUCTURAL MITIGATION

RECOMMENDATION 2.1

Test structural mitigation options and their associated cost benefits with a new digital flood model to identify measures that will provide the greatest effect by either increasing community safety, reducing the number of properties impacted or the extent of the impact and/or the frequency of flood events. Measures include detention basins in the upper catchments and assessment on the effects of causeways in the Todd River and the options to mitigate these effects.

The outcome of the assessment should inform a program of Capital Works to be funded by Government over a 5-10 year timeframe, which includes the necessary engineering design works.

RECOMMENDATION 2.2

That the preferred option to be progressed by the Department of Infrastructure, Planning and Logistics (previously the Department of Transport) on the Mount Johns Flood Immunity Project is supported by a flood study which demonstrates that any new infrastructure proposed does not negatively impact the existing flood profile of Alice Springs.

RECOMMENDATION 2.3

That an engineering investigation is undertaken to gain the necessary data to determine the technical feasibility and the flow on effects of widening the Todd River bed as it passes through Heavitree Gap; and that this investigation informs a future transport solution through the Gap to ensure improvements to the existing flood profile of Alice Springs as a result from any future works at this location.

RECOMMENDATION 2.4

Undertake a geomorphologic study to assess and inform an effective maintenance, modification or removal regime to manage sedimentation control in and around man-made structures in the Todd River to maximise its hydraulic efficiency.

3. FLOOD RESILIENCE

RECOMMENDATION 3.1

Funding to be provided for a continual annual public education program on flood risk, flood warning and flood preparation, including promotion at the regional show, school education programs, new resident pack on flooding information and updating of emergency services maps and brochures. It is recommended the program be similar in nature to the Top End Cyclone Season public information programme and is co-ordinated by the Northern Territory Emergency Services.

RECOMMENDATION 3.2

Review Alice Springs early warning system to further improve efficiency and lead times through additional and/or upgraded flood gauges and the investigation of new technologies available, to provide improved and reliable flood warning advice to residents and businesses.

RECOMMENDATION 3.3

The NT Emergency Services ensures the establishment of emergency shelters outside of the flood zone designed to cope with the displaced population in the event of a major flood.

4. LAND USE PLANNING

RECOMMENDATION 4.1

Upon completion of revised modelling and mapping for structural mitigation options, investigate appropriate controls for building works and land use in flood affected areas.

5. SUPPORT MEASURES

RECOMMENDATION 5.1

Establishment of a resilience grant for flood affected businesses and community organisations for improved pre-flood preparation, designed to make premises more flood resilient.

RECOMMENDATION 5.2

The Northern Territory Government adopts a policy to facilitate concessional loan schemes to eligible businesses following a flood event to assist businesses to remain operational during this period.

RECOMMENDATION 5.3

Review capabilities of current action plans for the supply of critical supplies such as essential foods, medical supplies and fuel, to support the community in a longer term flood isolation event.

6. TODD RIVER HEALTH MANAGEMENT COMMITTEE

RECOMMENDATION 6.1

The establishment of a Todd River Health Management Committee with the key purpose to provide advice to Government on the effective management of sedimentation in the Todd River, including maintenance and monitoring targets, and an ongoing assessment against these targets.

INTRODUCTION

The Committee has been tasked to assess and make recommendations regarding measures to reduce risks of flood events, including risks to public safety, and the economic and social impacts of major flood events in the Alice Springs Region.

Throughout the deliberations of the Committee, it is recognised that flood resilience is a shared responsibility of all sectors of society, including three levels of Government, business, non-government organisations and individuals. An integrated approach is essential towards ensuring an effective flood mitigation strategy.

The Committee would like to thank and acknowledge the input and submissions from the general public, the contents of which have been included in the drafting of its key recommendations.

Structural mitigation options have been identified in this report, however these cannot be fully analysed and modelled until topographical data for the upper catchments of the Todd River and its tributaries is available. Testing various structural mitigation options using an updated flood model, will have the outcome to produce a cost effective solution which provides the broadest flood immunity benefit for Alice Springs.

TERMS OF REFERENCE

On the 26 February 2016 the Northern Territory Government announced the establishment of a Flood Mitigation Advisory Committee in Alice Springs. The Committee met for the first time on 1 March 2016 and endorsed the Terms of Reference and work program to produce a final report for Government's consideration.

The key role of the Committee includes the following:

- Development of an overarching Flood Mitigation Strategy for the Alice Springs Region, including a policy framework for the mitigation of the flood risk and the impact of flood events;
- Provision of advice on specific policies, strategies, measures and actions necessary to support the achievement of the policy objectives of the Flood Mitigation Strategy; and
- Provide advice on an appropriate implementation framework for the Alice Springs Region Flood Mitigation Strategy.

Todd Mall Alice Springs, 1988 flood

FLOODING IN ALICE SPRINGS

Much of the town of Alice Springs is located on the floodplains of the Todd and Charles rivers. Residents and businesses are subject to riverine flooding that occurs when heavy rainfall causes the Todd River to flow and overtop its banks. Localised flooding also occurs as a result of overflows from stormwater drainage systems.

A number of significant flood events have occurred in Alice Springs, with observations of the largest flood having occurred in March 1910. However, accurate details of depth and extent of inundation of the 1910 flood was not recorded.

In 1953, a flow gauging station was established on the Todd River near Wills Terrace in Alice Springs.

The March 1988 flood is the highest on record since the Wills Terrace gauging station was established.

Table 1 lists the major flood events that have occurred in Alice Springs since 1983.

TABLE 1: MAJOR FLOOD EVENTS SINCE 1983[1]

Date	Gauge Peak Height, Anzac Oval (m)	Estimated Recurrent Interval (years)
18/3/1983	3.43	20
26/1/1984	3.23	10
31/3/1988	3.99	50
21/4/2000	3.22	10

[1] Department of Land Resource Management, Water Data Portal

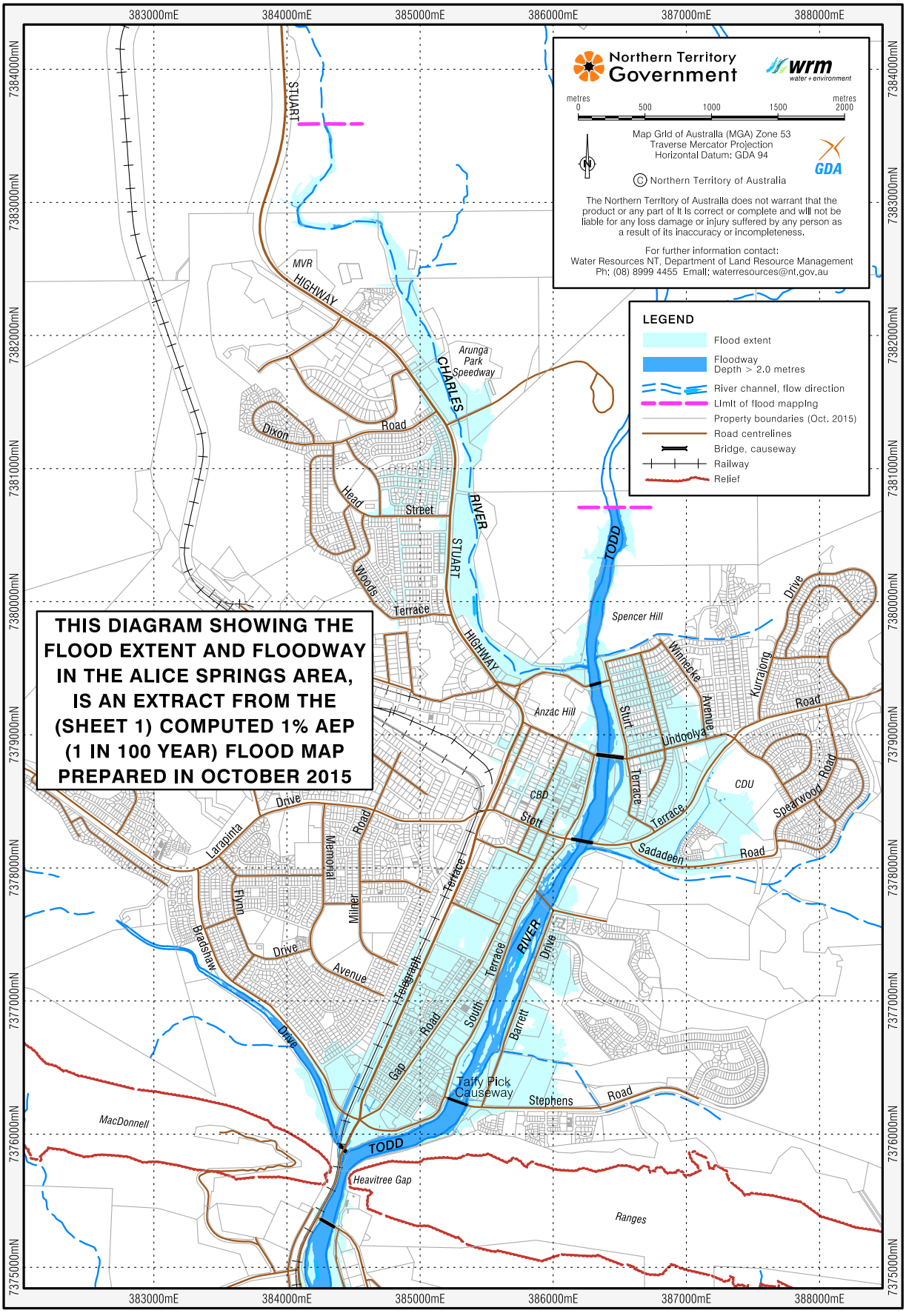
A number of previous reports have been undertaken to study the Alice Springs floodplain over the last 20 years to address the flood risk. The key reports that the Committee referred to are listed below;

- Alice Springs Flood Study, WRM 2011
- Alice Springs Floodplain Management Plan, GHD 1996
- Alice Springs Flood Mitigation Dam Environment Impact Statement, Power and Water Authority 1990.

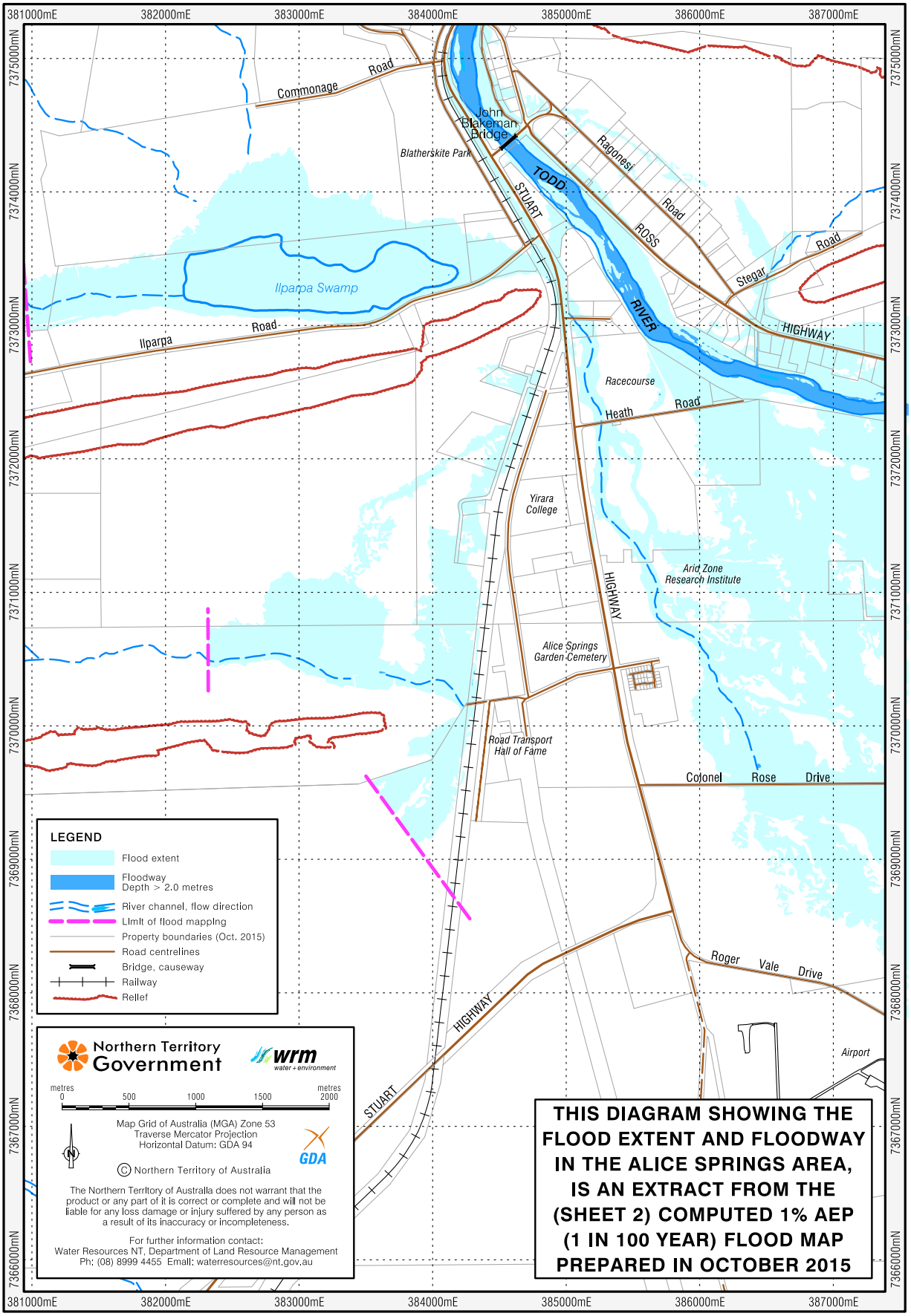
ALICE SPRINGS FLOOD MAPS

The diagrams below show the flood extent and floodway in the Alice Springs town area and rural areas, and are extracts from the computed 1% AEP (1 in 100 year) flood maps issued in February 2016.

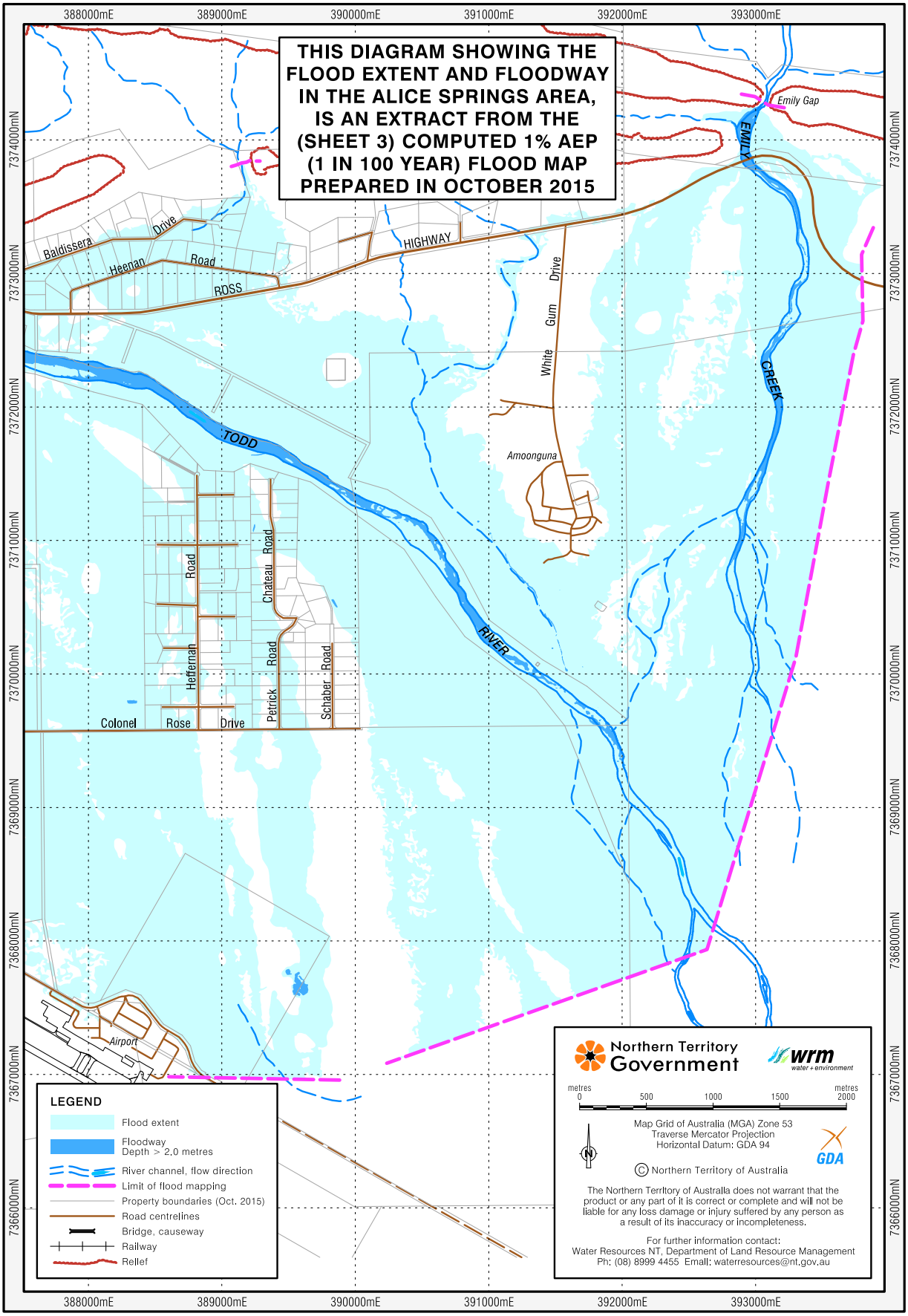
ALICE SPRINGS FLOOD MAPPING TOWN AREA (SHEET 1)



ALICE SPRINGS FLOOD MAPPING RURAL AREA WEST (SHEET 2)



ALICE SPRINGS FLOOD MAPPING RURAL AREA EAST (SHEET 3)



Alice Springs, 1988 flood

CULTURAL CONSIDERATIONS

The committee membership includes representation from Lhere Artepe, the recognised holder of Native Title over Alice Springs.

Throughout its deliberations, the committee understands that the various flood mitigation evaluation measures and their final recommendations will impact and touch the land of Central Australia in some form and to varying degrees.

It was considered critical that ownership and belief of the committee's recommendations was all inclusive and complete, as the impact of flooding has a direct effect on all people living in Alice Springs and its outskirts. The committee is certain that a successful adoption and implementation of flood mitigation measures must accommodate the community's needs which include the customs and beliefs of its traditional owners.

The committee acknowledges the guidance of Lhere Artepe in developing its recommendations and strongly recommends continuous communication and participation from Lhere Artepe throughout any further progress of these recommendations.

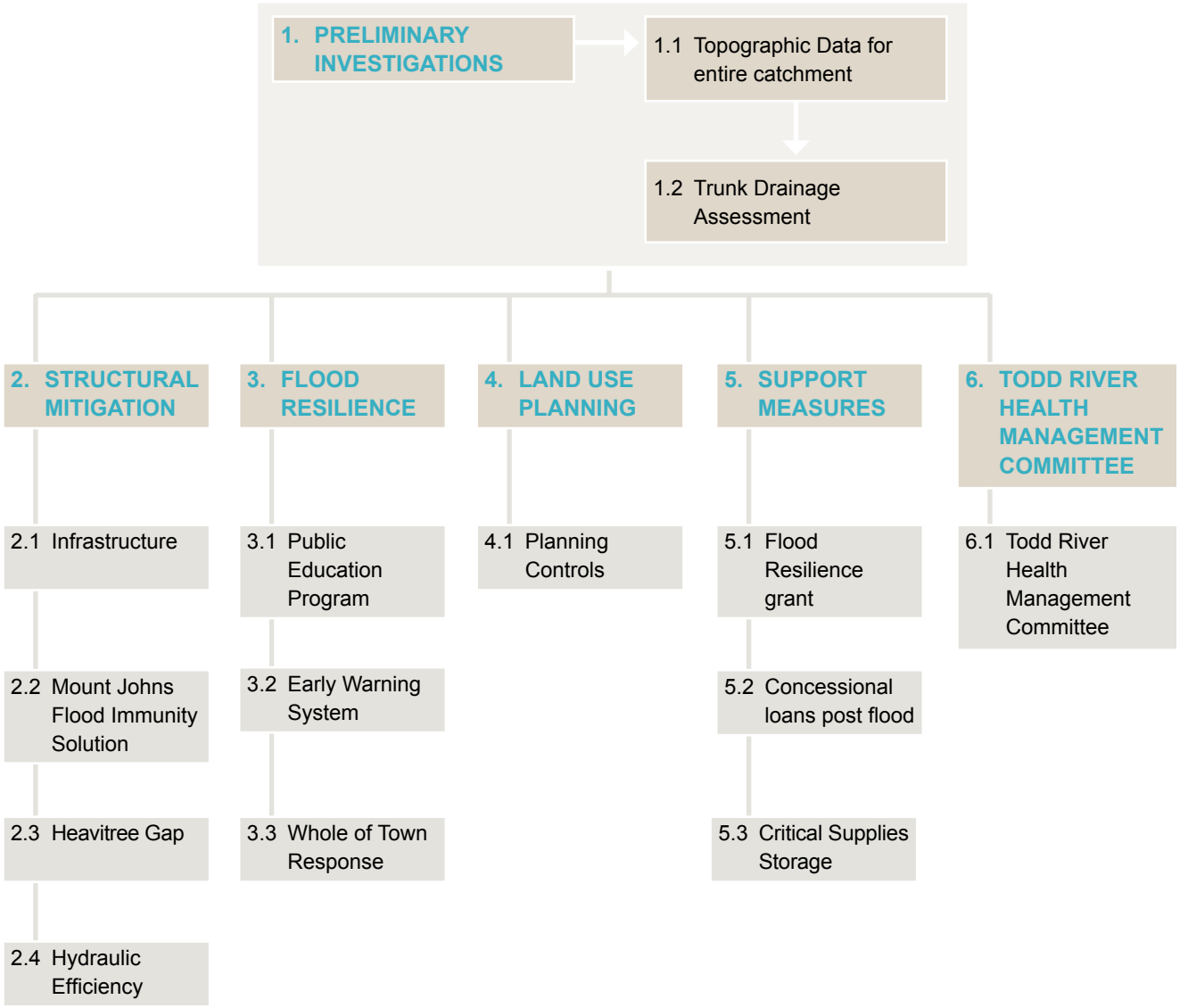
ALICE SPRINGS FLOOD MITIGATION STRATEGY

The Alice Springs Flood Mitigation Strategy incorporates a number of measures to work in unison with each other to mitigate the impact of flooding through the effective understanding and management of flood risks. The strategy builds on existing flood mitigation measures in implementation across the Northern Territory, in particular those recommended by the Katherine and Darwin Flood Mitigation Advisory Committees.

To mitigate the impact of flooding in Alice Springs requires a shared responsibility across all spectrums of society, recognising that individuals must respond to flooding with resilience, and governments support resilience through structural mitigation (where applicable), appropriate land use planning and other financial support measures.

It is important to note that structural solutions have limitations and no amount of intervention can stop flooding altogether for all rainfall events. It is extremely difficult to totally eliminate all risk. There will always be properties within the existing Alice Springs town boundaries that will be impacted upon by flooding.

The Alice Springs Flood Mitigation Strategy is outlined below;



ALICE SPRINGS FLOOD MITIGATION KEY RECOMMENDATIONS PULL OUT MAP

UPPER CATCHMENT

BOND SPRINGS

PHYLLIS CREEK

HEAVITREE GAP

STUART HIGHWAY

ALICE SPRINGS CBD

COLYER CREEK

DETENTION BASINS

2

Recommendation 2.1

The construction of strategically located detention basins designed to reduce the effects of flooding by restricting floodwater behind an embankment reducing the peak flow of a flood.

TOPOGRAPHIC DATA

1

Recommendation 1.1

Prior to implementation of structural mitigation recommendations represented on this map, there is a requirement to obtain detailed topographical information in the upper catchments of the Todd River to better inform final design solutions.

ANZAC HILL

CBD

STUART HIGHWAY

Anzac Hill L

Smith St

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Alice Springs Flood Mitigation Ke

CAUSEWAYS

3

Recommendation 2.1

The removal of any major contributors to flood events associated with bed level crossings in the Todd River.

CONNECTOR ROAD – STEPHENS ROAD TO SADADEEN ROAD – DIRECT ROUTE

4

Recommendation 2.2

The Committee supports the option to provide an improved year round connectivity in Mount Johns via a direct road-link that does not impact on the existing flood profile of Alice Springs.

TATING THE RIVER COURSE UGH HEAVITREE GAP

5

endation 2.3

transport solution through the Gap that the existing flood profile of Alice Springs t of future works in this location.

y Recommendations

1. PRELIMINARY INVESTIGATIONS

1.1 TOPOGRAPHIC DATA FOR ENTIRE CATCHMENT

The Todd River catchment covers an area of 525km^2 to Heavitree Gap, including the upper headwaters of the catchment and the major tributaries of the Todd River, such as Coyler Creek and the Charles River.

Preliminary studies demonstrate the possibility for structural mitigation measures in the upper catchments, such as detention basins which capture and slowly release water runoff, to potentially reduce the flood peak flows in Alice Springs substantially.

Further testing is warranted, but there is currently a lack of detailed topographic information in the upper catchments of the Todd River that is required to develop the detailed analysis and testing of mitigation options.

The current topographic data used to produce the flood maps for Alice Springs does not cover the upper catchments of the Todd River. In order to test possible mitigation measures in the upper catchment area, in particular detention basins, requires topographical data for the entire catchment.

Estimated cost: $500,000.

RECOMMENDATION 1.1

Detailed topographic data to be acquired for the upstream catchments of the Todd River to allow further investigation of potential mitigation options to reduce the peak flow of a flood. Investigations to include the subsequent reduction in the impact of flooding to the Alice Springs Regions, including rural areas further west impacted by Roe Creek.

1.2 TRUNK DRAINAGE ASSESSMENT

Stormwater flooding, when occurring in isolation of riverine flooding, is expected to typically be more localised and result from shorter duration, higher intensity rainfall within the catchment upstream of drainage infrastructure. These events are expected to have a low event cost. The frequency of occurrence is also typically low (less than 1 per year), but higher frequency occurrences will result in a higher cumulative cost.

Stormwater flooding can potentially cause significant disruption and nuisance to the community in addition to creating safety hazards. Safety hazards can include loss of access for emergency vehicles, reduced road accessibility for the public, dangerous flows over roads or in drains and dangerous depths of standing water within public areas.

Stormwater flooding can additionally exacerbate the consequences of major riverine flooding events through stormwater backup affecting areas higher up in the catchment than areas affected by the overbank riverine flooding. This flooding can occur as a result of various conditions including; substandard drainage infrastructure or from increased water levels (tail water levels) at the outlets to drainage infrastructure.

RECOMMENDATION 1.2

Undertake an assessment of all existing trunk (major) drainage infrastructure to identify works, upgrades or maintenance regimes required to the drainage system to reduce the impact and/or frequency of localised stormwater flooding.

This can create additional hazards through reducing accessibility, in particular for evacuation by emergency services, and for accessing services more generally.

An assessment of all existing trunk drainage infrastructure to identify current capacity requitrements, will assist in determining any works required to alleviate stormwater flooding.

Estimated cost: $300,000.

2. STRUCTURAL MITIGATION

2.1 INFRASTRUCTURE

A primary risk to Alice Springs is the difficulty to mitigate flooding where there are potentially very short warning times for the larger volume and velocity flash flooding events. This risk may be substantially mitigated by the construction of detention structures in the upper catchment of the Todd River where water can be captured via a series of purpose designed structures which control the speed of release of higher volume flows to reduce the flood peak of a flood event.

Topographical data of the upper catchment area is required to develop a new digital flood model that can be used to understand the effect of a range and combination of structural mitigation measures, including detention basins. The assessment should also include the effects of causeways in the Todd River and options to mitigate these effects, as well as the flow on impacts to properties south of the Gap and in rural areas.

The assessment should be aimed at identifying the number, location and concept design of detention structures needed to cause a material impact on the flood immunity protection of Alice Springs (suggested from 10% immunity to 100% immunity for a 50 year estimated recurrence interval event).

The assessment should include a cost benefits analysis to assist in recommending measures that will provide the greatest effect by either reducing the number of properties impacted, the extent of the impact and/or the frequency of flood events, together with an order of priority of effectiveness of the structures.

RECOMMENDATION 2.1

Test structural mitigation options and their associated cost benefits with a new digital flood model to identify measures that will provide the greatest effect by either increasing community safety, reducing the number of properties impacted or the extent of the impact and/or the frequency of flood events. Measures include detention basins in the upper catchments and assessment on the effects of causeways in the Todd River and the options to mitigate these effects.

The outcome of the assessment should inform a program of Capital Works to be funded by Government over a 5-10 year timeframe, which includes the necessary engineering design works.

The outcome of the assessment should inform a program of Capital Works to be funded by Government over a 5-10 year timeframe that leads to a significant and increased immunity.

Estimated cost: $500,000 for initial modelling/testing and a Capital Works budget of $30 million over a 5 - 10 year timeframe.

2.2 MOUNT JOHNS FLOOD IMMUNITY SOLUTION

The Department of Infrastructure, Planning and Logistics (DIPL), previously the Department of Transport, is currently undertaking the Mount Johns Flood Immunity Project, investigating flood immunity solutions for the Mount Johns and Desert Springs areas of Alice Springs.

At the time of drafting this report, DIPL was in the early stages of project development, where a number of options have been identified, and feedback through community consultation underway.

Given this project has the potential to impact the current flood extents in Alice Springs, in consultation with the Committee, DIPL has recognised that it is vital to undertake flood studies to understand the impact of any potential new infrastructure on the current flood profile.

RECOMMENDATION 2.2

That the preferred option to be progressed by the Department of Infrastructure, Planning and Logistics (previously the Department of Transport) on the Mount Johns Flood Immunity Project is supported by a flood study which demonstrates that any new infrastructure proposed does not negatively impact the existing flood profile of Alice Springs.

Estimated cost: $25 million to construct preferred technical option as per the Mount Johns Flood Immunity Project.

2.3 HEAVITREE GAP

Substantial flooding of the Alice Springs CBD and southern suburbs in Alice Springs (immediately upstream of Heavitree Gap) has occurred in historical floods. Investigations on the existing constraints within and adjacent to Heavitree Gap are warranted to identify potential measures that can increase the capacity of the river bed and allow for reductions in backwater flooding for all flood events.

The Department of Infrastructure, Planning and Logistics (previously the Department of Transport) is currently undertaking preliminary investigations into the duplication of the Stuart Highway from Tom Brown Roundabout to Roger Vale Drive. The Stuart Highway is of national strategic significance in the Northern Territory highway network. A consideration within this project is to look at flood immunity of the road. Any duplication of the Stuart Highway should also assess the existing carriageway and the feasibility of a traffic solution that can improve the flood profile of Alice Springs.

Estimated cost: $100 million for future Capital Works.

RECOMMENDATION 2.3

That an engineering investigation is undertaken to gain the necessary data to determine the technical feasibility and the flow on effects of widening the river bed as it passes through Heavitree Gap; and that this investigation informs a future transport solution through the Gap to ensure improvements to the existing flood profile of Alice Springs result from any future works at this location.

2.4 HYDRAULIC EFFICIENCY

Ongoing maintenance of the Todd River to maintain structural integrity of natural and man-made drainage systems is essential for the effective functioning of the system.

A geomorphological study will identify areas of inefficiencies within the river and inform an ongoing maintenance plan to keep the river free of restrictions, such as the build-up of sedimentation around man-made structures such as bridge culverts and/or causeways.

Developing and maintaining a regular maintenance schedule for flood prone areas is essential to firstly clear blockages and then prevent the recurrence of hydraulic inefficiencies.

Estimated cost: $100,000.

RECOMMENDATION 2.4

Undertake a geomorphologic study to assess and inform an effective maintenance regime to manage sedimentation control in and around man-made structures in the Todd River to maximise its hydraulic efficiency.

3. FLOOD RESILIENCE MEASURES

3.1 PUBLIC EDUCATION PROGRAM

Improving flood resilience to a flood event relies heavily on individual responses to flooding by residents and businesses. It is key that individuals have access to information on flood risk, flood warning and flood preparation, and that there is sufficient education for not only existing residents but for new residents as well.

The keys to individual flood resilience are:

- Flood information that accurately describes the risk of flooding to provide the community (in particular new residents) with an awareness of the flood risk without unnecessarily overstating the risk;
- Provide efficient platforms and education programs for the community so individuals have the knowledge to plan and respond to a flood; and
- Communicate effectively with the community prior to, during and after a flood event.

It is proposed to improve the existing public education program incorporating culturally appropriate social media, television and print advertisements. This should also include;

- Flood awareness stall at the Alice Springs Show;
- Promotion of flood free emergency evacuation areas;
- Engagement with local councils on flood support for vulnerable households in flood zones on communities;
- Mechanisms for improving warnings for people sleeping in the river bed; and
- Public workshops and meetings.

Estimated cost: $200,000 over five years.

RECOMMENDATION 3.1

Funding to be provided for a continual annual public education program on flood risk, flood warning and flood preparation, including promotion at the regional show, school education programs, new resident pack on flooding information and updating of emergency services maps and brochures. It is recommended the program be similar in nature to the Top End Cyclone Season public information programme and is co-ordinated by the Northern Territory Emergency Services.

3.2 EARLY WARNING SYSTEM

An accurate prediction of when a flood event will occur is a significant factor in developing flood resilience within a community. An early warning allows residents and businesses sufficient time to respond through individual and community flood response plans.

There are existing flood gauges and rainfall recorders within the Todd River catchment that provide the Bureau of Meteorology and the Department of Environment and Natural Resources with near real time data for flood height predictions. Time of response to flood threats is crucial because in extreme events as little as one hour may be available between a threat being identified in the catchment and the flood reaching town.

The factors that provide for an effective early warning system are;

- Extend the lead time to provide residents and business additional time to prepare for a flood event;
- Reduce complacency or undue alarm within the community by reducing the occurrence of false alarms through greater accuracy within the system to predict when an event will occur and how severe it will be; and
- The ability to alert the community to an impending flood event quickly and effectively.

Estimated cost: $250,000 over three years.

RECOMMENDATION 3.2

Review Alice Springs early warning system to further improve efficiency and lead times through additional and/ or upgraded flood gauges and the investigation of new technologies available, to provide improved and reliable flood warning advice to residents and businesses.

3.3 WHOLE OF TOWN RESPONSE

For many residents and businesses the only response in a large flood is to evacuate to higher ground.

The existing emergency evacuation centres and safe mustering points for the public must ensure that the displaced population will be supported in the event of a large flood until evacuation or assistance can be provided.

NT Emergency Services is to undertake an audit of the existing emergency shelters to ensure that current arrangements are suitable to cater for a 1 in 100 year flood event. The Committee also recommends reviewing accessibility to these shelters by people either side of the Todd River north of the Gap, and people living south of the Gap.

Given the random nature of flooding, emergency shelters should have a primary function that ensures the ongoing maintenance of the structures so that when required, the shelters can be brought into operation. These structures, that have a secondary function as emergency shelters, must have the facilities necessary to support this use when required.

The Committee recommends that NT Emergency Services includes in its audit of the existing facilities, an assessment of the functionality of each structure to provide the necessary function as an emergency shelter and where deficiencies are identified, upgrade each structure accordingly.

Alice Springs is also a support hub for an extensive region within Central Australia and consideration should be given to provide support for remote communities across Central Australia in the event of major flooding.

RECOMMENDATION 3.3

The NT Emergency Services ensures the establishment of emergency shelters outside of the flood zone designed to cope with the displaced population in the event of a major flood.

4. LAND USE PLANNING

4.1 PLANNING CONTROLS

Planning and land use controls address flood mitigation at the planning level by regulating land use activities in areas that may be prone to flooding.

Flood risk should be considered as early as possible in the planning and development process and planning decisions affecting flood affected land should take into account the best available flood information. The latest Alice Springs flood extent maps published in February 2016 by the Department of Environment and Natural Resources are used for planning purposes under the *NT Planning Scheme* and referred to under the *NT Building Act.*

Within the *NT Planning Scheme* there is an emphasis on avoiding certain land uses in areas affected by flooding. Development of land in any zone within a defined flood area requires the prior approval of the Development Consent Authority as well as compliance with the *NT Building Act* (with reference to National Standards).

Both Planning and Building Regulations require new homes or substantial renovations to construct habitable rooms at the minimum 300mm above the 1% AEP flood level for the site.

For pre-existing homes within a defined flood zone, the options available to address flood risk depends on the severity of the flooding.

RECOMMENDATION 4.1

Upon completion of revised modelling and mapping for structural mitigation options, investigate appropriate controls for building works and land use in flood affected areas.

5. SUPPORT MEASURES

5.1 PRE-FLOOD RESILIENCE GRANT

A community's flood resilience is often closely linked to how quickly local businesses and community organisations can become operational post flood, therefore providing financial stability for local residents also recovering from a flood.

A flood resilience grant for (directly) flood affected businesses and community organisations should be used pre-flood to assist in making premises more flood resilient which in turn assists in recovery. Such a grant would assist organisations in managing a flood event and return to normal operations faster.

Examples might include advisory services for the development of an emergency plan or retrofitting of property to limit water ingress.

The grant would need to have a number of controls, such as capping the amount available and a co-contribution from commercial entities to promote the efficient use of the grant.

Estimated cost: $1.5 million.

RECOMMENDATION 5.1

Establishment of a resilience grant for flood affected businesses and community organisations for improved pre-flood preparation, making premises more flood resilient.

5.2 CONCESSIONAL LOANS POST-FLOOD

Following a flood, businesses can also suffer from reduced or limited cash flow to pay suppliers or meet their financial obligations. The availability of a concessional loan scheme to eligible businesses can assist with immediate cash flow concerns following a flood and assist businesses to remain operational during this period.

RECOMMENDATION 5.2

The Northern Territory Government adopts a policy to facilitate concessional loan schemes to eligible businesses following a flood event to assist businesses to remain operational during this period.

5.3 CRITICAL SUPPLIES STORAGE

Following a major flood event the community will be isolated from external assistance for a considerable period of time. The speed at which critical activities can recommence such as businesses, support services, schools and medical services, is directly related to the ability of the affected residents to be engaged in recovery and a sense of purpose. To ensure the community rebuilding process can start, critical essential supplies need to be available.

RECOMMENDATION 5.3

Review capabilities of current action plans for the supply of critical supplies such as essential foods, medical supplies and fuel, to support the community in a longer term flood isolation event.

6. TODD RIVER HEALTH MANAGEMENT COMMITTEE

6.1 TODD RIVER HEALTH MANAGEMENT COMMITTEE

The ongoing hydraulic health of the Todd River is a key component of an overall flood mitigation plan. Effective management of sediment in the Todd River is necessary to mitigate the adverse impacts that increased sediment deposits can have on flooding.

The provision of advice to government from a single body of key stakeholders to address the monitoring and management of sedimentation and erosion issues of the Todd River is therefore seen as critical.

RECOMMENDATION 6.1

The establishment of a Todd River Health Management Committee with the key purpose to provide advice to Government on the effective management of sedimentation in the Todd River, including maintenance and monitoring targets, and an ongoing assessment against these targets.

COMMONWEALTH FUNDING ARRANGEMENTS FOR FLOOD MITIGATION

The existing Natural Disaster Resilience Program (NDRP) funding under the National Partnership Agreement expired on 30 June 2015. The NDRP is a grant funding program that encourages governments to work together with volunteers, the private sector and non-government sectors in an effort to enhance Australian communities' resilience to natural disasters. The funding for the Northern Territory was a total estimate of $2.7 million over two years.

At the time of releasing this report, no new funding arrangements under the NDRP have been announced. The recommendations in this report do not consider any Commonwealth funding allocation. Any potential future Commonwealth funding is subject to an assessment process at the time the funding becomes known and available.

WORKS PLAN – ALICE SPRINGS FLOOD MITIGATION

TABLE 2: WORKS PLAN

MITIGATION MEASURE	LEAD AGENCY	IMMEDIATE (YEAR 1)	SHORT (YEAR 2-3)	MEDIUM (YEAR 4-5)	LONG (YEAR 5+)
1 PRELIMINARY INVESTIGATIONS					
1.1 Detailed topographic data	DIPL/DENR	$500,000			
1.2 Trunk drainage assessment	DIPL/ASTC	$300,000			
2 STRUCTURAL MITIGATION					
2.1 Infrastructure – Digital Flood Modelling/testing Structural measures	DIPL/DENR	$500,000	$10 million[1]	$10 million[1]	$10 million[1]
2.2 Mount Johns Flood Immunity Solution	DIPL	DIPL Funding		$25 million	
2.3 Heavitree Gap	DIPL	DIPL Funding			$100 million
2.4 Hydraulic Efficiency – Geomorphologic Study	DIPL/DENR	$100,000			
3 FLOOD RESILIENCE					
3.1 Public Education Program	NTES	$50,000	$50,000	$50,000	$50,000
3.2 Early Warning System	DENR/NTES	$50,000	$200,000		
3.3 Whole of Town Response	NTES	NTES Funding			

TABLE 2: WORKS PLAN (CONTINUED)

MITIGATION MEASURE	LEAD AGENCY	IMMEDIATE (YEAR 1)	SHORT (YEAR 2-3)	MEDIUM (YEAR 4-5)	LONG (YEAR 5+)
4 LAND USE PLANNING					
4.1 Planning Controls	DIPL		DIPL Funding		
5 SUPPORT MEASURES					
5.1 Pre-flood Resilience Grant	NT Treasury/ DIPL		$1.5 million		
5.2 Concessional Loans Post-flood	NT Treasury				
5.3 Critical Supplies Storage	NTES		TBA[2]		
ESTIMATE COST		**$1.5 MILLION**	**$11.75 MILLION**	**$35.05 MILLION**	**$110.05 MILLION**

[1] Notional amounts based on the construction of 3 Detention Basins in the upper catchment, which is dependent upon the outcome of testing Structural mitigation measures.

[2] To be advised based on outcome of an audit.

PUBLIC FEEDBACK

Public feedback was sought in the compilation and prior to the finalisation of this report. The draft report was officially open for public comment for a period of 4 weeks, closing on the 2nd July 2016.

During the period of drafting the Report, six submissions were received. Three submissions were received from the local community, one submission from the Member for Araluen and two submissions from government organisations. The Committee carefully considered all submissions and feedback received throughout its deliberations.

REFERENCES

Department of Lands, Planning and the Environment 2015, *Katherine Region Flood Mitigation Advisory Committee Report,* Northern Territory.

Department of Lands, Planning and the Environment 2015, *Darwin Region Flood Mitigation Advisory Committee Report,* Northern Territory.

Department of Land Resources, *Floodplain maps*, https://landresources.nt.gov.au/water-resources/flooding-reports-maps/floodplain-maps, (accessed April 2016)

GHD 1996, *Alice Springs Floodplain Management Plan*, Northern Territory.

Northern Territory Emergency Service, *Floods,* http://www.pfes.nt.gov.au/Emergency-Service/Public-safety-advice/Floods.aspx, (accessed March 2016).

Power and Water Authority 1990, *Alice Springs Flood Mitigation Dam Environment Impact Statement*, Northern Territory.

WRM Water & Environment 2011, *Alice Springs Flood Study*, Northern Territory.