Prepared for
ACT Planning
and Land Authority

30 April 2010
Draft

AECOM

Majura
District.

Majura Valley

Engineering Feasibility Study

Majura
District

Enhancing and sustaining the world's built, natural and social environments.

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Majura Valley Engineering Feasibility Study

Prepared for

ACT Planning and Land Authority

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Executive Summary

The Eastern Broadacre Planning Study (EBPS) has identified areas within the Majura Valley for potential development as part of the planning for the eastern corridor for employment land uses. The EBPS identified that the lack of key engineering services in the Majura Valley is a major limitation on development. Further investigations into the existing water, sewerage, stormwater and flooding, electricity, gas and communications is necessary to determine the capacity of existing infrastructure and augmentation options to allow for future development in the Majura Valley.

Further investigation into servicing strategies for the potential development areas, with consideration of the existing physical, environmental and planning constraints was required. AECOM Australia Pty Ltd (AECOM) was engaged by ACT Procurement Solutions on behalf of ACTPLA to undertake the Majura Valley Engineering Feasibility Study, and consider existing physical, environmental and planning constraints for servicing the Investigation Areas.

An estimated net developable area for each Investigation Area was determined based on known environmental, heritage, physical and servicing constraints. Table 1 illustrates the total area of each Investigation Area, area of constraints and net developable area.

Table 1 Summary of investigation areas

i	Area (ha)	Constraints (ha)	Net Developable Area - roads and open spaces (ha)	Net Developable Area - excluding roads and open spaces (ha)
A				
Scenario A	222	Not applicable	Zero – Possible Broadacre zone development or minimal changes to existing uses.	
Scenario B	222	Not applicable – potential 20 ha development to be located to avoid constraints.	20 ha total for a potential tourist facility or resort.	
B				
Scenario A	650	99	155	233
C				
Scenario A	153	50	41	62
Scenario B	251*	76	70	105
D				
Scenario A	102	Not applicable	Not applicable - Retain and enhance or develop for uses under existing Broadacre Zone	
Scenario A Part 1	102	Not applicable	13	18
Scenario B Part 2	102	Not applicable	31	71

*251 ha if Defence lands transferred to the ACT Government

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Ecological and Heritage

Within the Investigation Areas, there are a number of identified ecological and heritage constraints. Investigation areas A and B are characterised by woodland vegetation that ranges from substantially and severely modified to higher quality Box Gum Woodland[1] endangered ecological community (EEC). This EEC is relatively well represented at a local scale, with approximately 700 hectares of the community identified within the adjacent Mount Ainslie and Mount Majura Nature Reserve. In the south of the Majura Valley, Investigation Area C is characterised by grassland which is recognised as one of the most significant areas within the ACT for the conservation of threatened species. The area contains habitat for the threatened Grassland Earless Dragon, the Golden Sun Moth, and the Striped Legless Lizard. Investigation Area D in the Pialligo area conversely contains no substantial biodiversity constraints.

In terms of heritage constraints, previous investigations have identified numerous relics, some of which have not been assessed in detail for heritage status. However there are a number of known and listed heritage items, including the Gladefield Homestead, and Majura House within Investigation Area B, and the Duntroon Woolshed and Dove Cottage in Investigation Area C. Other heritage items include potential Aboriginal Scarred trees, and scattered artefact deposits, which will need to be considered and assessed in more detail when specific development scenarios are more clearly understood. It is expected that these constraints are not significant, in that most adverse impacts can be avoided, with careful planning and siting of development activities and alignment of associated infrastructure.

Water Sensitive Urban Design (WSUD)

As a greenfield site, the Majura Valley can readily adopt a water sensitive urban design approach to development in a structured and cost effective manner. The principle of demand management, water reuse and industrial ecology can inform the planning phase to provide an optimal outcome. Site generated stormwater runoff should be managed to achieve nationally recognised best practice water quality treatment at a minimum. The capture and treatment of runoff provides the opportunity to harvest treated water for reuse within the precinct and beyond. The volumes of water harvested will be guided by the identified serviceable demands within the precincts demands, integration with stormwater harvesting schemes outside of the Majura Valley and the intent to mimic the pre-development hydrology of Woolshed Creek. The harvest of treated water will also enable the regional targets identified in ACTPLA's Water Sensitive Design Code to be met. Based on the results of the modelling a relationship of treatment area to contributing impervious catchment has been determined for both the centralised regional treatment approach and the more distributed best practice approach. In both instances we have considered either saturated zone (SZ) bioretention systems or wetlands and in the case of the regional treatment approach allowed for modelling of regional ponds. For (SZ) bioretention systems, a filtration surface area of 1 % of the contributing impervious area is required. For wetlands a vegetated macrophyte zone of either 8% (regional) 3.5% (best practice) of the contributing impervious catchment is required. In the case of an open water pond, a relationship of 10% open water to contributing impervious area would be required. A pond of this size represents a risk of algal blooms during inter-event periods. These spatial relationships have been prescribed to achieve best practice water quality treatment of runoff. The actual surface area required for the bioretention systems (allows for extended detention, freeboard and appropriate safe batter slopes) will be dependent on the final configuration of the systems. Likewise wetlands will require spatial allowance for batter slopes and inlet zones.

Costs incurred for the construction of precinct wide treatment systems will vary significantly depending on the ultimate design of the overall development and final treatment strategy adopted. Stormwater treatment measures most appropriate for the respective precincts will need to be formulated in conjunction with development layout and configuration as part of precinct-based water management plans. Detailed costing of these measures can then be undertaken.

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[1] It should be noted that owing to the nature of the investigation, ecological constraints have largely been identified from a desktop study, drawing on available information sources. In this context there is the potential for areas not identified as Box Gum Woodland EEC by Territory and Municipal Services, to actually fit the criteria for listing as the EEC under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This issue will need to be further explored in more detail, as planning progresses.

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Approximate costs for typical systems can be estimated using guidelines provided by Landcom (2009). Total Acquisition Costs and Annual Maintenance Costs have been estimated for bioretention systems and constructed wetlands. A range of costs is given. The range reflects the relatively high start up cost and the increase in cost efficiency associated with the construction of larger systems. Therefore, on an aerial basis it is expected that smaller treatment systems designed to treat runoff from individual lots will be more expensive than large precinct-scale treatment systems.

1.1.1 Total Acquisition Costs

The estimates of Total Acquisition Costs are as follows:

Bioretention systems

- If implemented in a distributed way = \$1000 per m^2.
- If implemented at the precinct-scale = \$300 per m^2.

Constructed Wetlands

For constructed wetland systems sized between 100 m^2 and 1000 m^2. total acquisition costs are estimated to be between \$200 to \$400 per m^2. Smaller systems cost more on a per m^2 basis due to the high initial start up costs associated with construction.

1.1.2 Maintenance Costs

Annualised maintenance costs for these treatment systems have also been calculated. Like construction costs, maintenance also becomes less costly on an aerial basis for treatment systems that are larger rather than smaller. A range of estimates is provided to accommodate this.

Annualised maintenance costs are:

- Bioretention systems = \$2 to \$4 per m^2
- Constructed wetland systems = \$3 to \$5 per m^2

Maintenance costs will typically include general maintenance of public areas, litter control, weed control (especially during establishment phase) and inspection (with occasional repairs) of hydraulic structures (pipes/pits/weirs etc).

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Servicing Strategy

High level infrastructure improvements are required before services can be extended to the Investigation Areas. These improvements include:

- Water – Construction of a new Majura reservoir is required to provide water service to areas located between contour levels 650 m and 690 m. New distribution mains will be required from the Upper Hackett, new Majura, and Campbell reservoirs to the Investigation Areas.
- Sewer – The Fyshwick Sewage Treatment Plant and Majura Sewage Pump Station (MSPS) are near capacity. ActewAGL has planned upgrades to these facilities which should be completed prior to 2031. A second option is for a package treatment plant to be located within the development. The existing sewer trunk main located in Investigation Area C will need to be extended north into Investigation Areas A and B to service the developments.
- Gas – A new gas off-take station and mains to the development will be required.
- Electricity – It is anticipated that new 11 kV feeders from the Eastlake Zone Substation will be constructed to service the proposed development.
- Telecommunications – TransACT infrastructure will need to be extended from Campbell to service the Investigation Areas.

Costing

The anticipated cost of providing water, sewer, gas, electricity, and telecommunications services to the Investigation Areas is summarised in Table 2.

Table 2 Summary of servicing costs

Description	Approximate Cost (excluding GST)	
	Option 1*	Option 2*
Investigation Area A	$7,098,000	$7,098,000
Investigation Area B	$14,420,000	$14,812,000
Investigation Area C	$16,408,000	$16,016,000
Investigation Area D	$4,102,000	$2,170,000
Total:	$42,028,000	$40,096,000

Notes regarding servicing costs:

- Costs include 40% contingency, and are exclusive of GST.
- *Cost of gas infrastructure dependent upon location of future off-take station:
  - Option 1: Off-take station located within Investigation Area B.
  - Option 2: Off-take station located within Investigation Area C.
- FSTP and MSPS improvements by ActewAGL at ActewAGL's expense.
- ActewAGL will be responsible for extending 11 kV feeders from Eastlake Zone substation.
- Final cost of telecommunications cost to developer will be a percentage of TransACT's costs, and will be determined by TransACT at a later date.

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Staging Strategy

ACTPLA's program of potential developments indicates that the order of development for Investigation areas will be C B/ D, then A. Water, sewer, gas, electricity and telecommunications have dependencies on infrastructure being extended through Areas C and D. However, each Investigation Area is not entirely dependent upon the other areas being developed as long as service corridors are allowed for. Table 3 summarises staging dependencies the Investigation Areas.

Table 3 Investigation Area Staging

Investigation Area	Service	Staging Comments
C		
	Water	Provide new distribution mains from Campbell Reservoir.
	Sewer	Extend trunk sewer to northern boundary of Investigation Area.
	Gas	Gas main from new off-take station. Infrastructure is dependent upon location of the off-take station: • Location no. 1 – extend gas main into Investigation Area from east, and then extend north and south within Investigation Area. • Location no. 2 – extend gas main south through Investigation Area B and into C.
	Electricity	Extend11 kV feeders from new Eastlake Zone Substation through Investigation Area D and to northern limits of Investigation Area boundary. Construction distribution substation(s) within Investigation Area.
	Telecommunications	Extend TransACT infrastructure from Campbell to northern boundary of Investigation Area.
B		
	Water	Provide new distribution main from Upper Hackett Reservoir to northern and southern boundaries of Investigation Area. Construct new Majura Reservoir and provide transmission main north to Investigation Area boundary.
	Sewer	Extend trunk sewer from northern boundary of Investigation Area C to northern boundary of Investigation Area B.
	Gas	Gas main from new off-take station. Infrastructure is dependent upon location of the off-take station: • Location no. 1 – extend gas main into Investigation Area B from northern boundary of Investigation Area C. • Location no. 2 – extend gas main from off-take station north to northern boundary of Investigation Area.
	Electricity	Extend 11 kV feeders from northern boundary of Investigation Area C to northern boundary of Investigation Area B.
	Telecommunications	Extend TransACT infrastructure from northern boundary of Investigation Area C to northern boundary of Investigation Area B.
A		
	Water	Extend transmission mains (from Majura and Upper Hackett Reservoirs) from northern boundary of Investigation Area B north into Investigation Area A.
	Sewer	Extend trunk sewer from northern boundary of Investigation Area B into Investigation Area A.
	Gas	Extend gas main from northern boundary of Investigation Area B into Investigation Area A.
	Electricity	Extend 11 kV feeders from northern boundary of Investigation Area B into Investigation Area A.
	Telecommunications	Extend TransACT infrastructure from northern boundary of Investigation Area B into Investigation Area A.

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Investigation Area	Service	Staging Comments
D		
	Water	Extend transmission main from (Campbell Reservoir) from near Investigation Area C boundary into Investigation Area D (if required).
	Sewer	No interdependencies. Additional connections to trunk main located within Investigation Area D may be required.
	Gas	Extend gas main south from Investigation Area C into Investigation Area D (if required).
	Electricity	Connect to 11 kV underground feeders which have been extended through Investigation Area D as part of the works associated with Investigation Areas C.
	Telecommunications	Connect to TransACT infrastructure extended as part of Investigation Area C works. Extend to Investigation Area D as required.
	Water	Connect to distribution main extended as part of Investigation Area C works.
	Sewer	No interdependencies. Connect to trunk sewer located within Investigation Area D.

Additional investigations

The information presented in this report is based largely on desktop investigations, supplemented with extensive agency and stakeholder consultation. As such there are a number of limitations associated with the information provided, and as specific development scenarios become more clearly understood, some additional investigations may be required including:

- More detailed field assessments of vegetation in order to determine the definitive extent of Box Gum Woodland, in accordance with both ACT legislation and the Commonwealth EPBC Act.
- Contamination (if present) within the Investigation Areas has not been considered. As such a preliminary Phase 1 contamination assessment is recommended to identify any areas where, owing to historical land use activities, contamination that could influence or preclude development may be present.

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Abbreviations

ACTPLA	ACT Planning and Land Authority
ACT PS	ACT Procurement Solutions
ADF	Australian Defence Force
$ADWF_G$	Average Dry Weather Flow from gravity sources only
$ADWF_T$	Average Dry Weather Flow including pumped flow
AHD	Australian Height Datum
ARQ	Australian Runoff Quality
BASIX	Building for Sustainability Index
DEWHA	Commonwealth Department of Environment, Water, Heritage and the Arts
EBPS	Eastern Broadacre Planning Study
ESD	Ecologically Sustainable Development
EIS	Environmental Impact Statement
EP	Equivalent Population
EMS	Event Means Concentration
FSTP	Fyshwick Sewage Treatment Plant
FSPS	Fyshwick Sewage Pump Station
MSPS	Majura Sewage Pump Station
MVES	Majura Valley Engineering Study
MUSIC	Model for Urban Stormwater Improvement Conceptualisation
NCERS	North Canberra Effluent Reuse Scheme
$PDWF_G$	Peak Dry Weather Flow from gravity source only
$PDWF_T$	Peak Dry Weather Flow including pumped flow
PII	Peak Infiltration and Inflow
PWWF	Peak Wet Weather Flow
TaMS	Territory and Municipal Services
TEP	Total Equivalent Population
TN	Total Nitrogen
TP	Total Phosphorous
TSS	Total Suspended Solids
VHST	Very High Speed Train
WSUD	Water Sensitive Urban Design

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1.0 Introduction

The Eastern Broadacre Planning Study (EBPS) has identified areas within the Majura Valley for future potential development as part of the planning for the eastern corridor for employment land uses. ACTPLA needed to complete further investigation into servicing strategies for the potential development areas with consideration of the existing physical, environmental and planning constraints. AECOM was engaged by ACT Procurement Solutions on behalf of ACTPLA to undertake the Majura Valley Engineering Feasibility Study. The following items were investigated as part of the study:

- A description of the current nature, location and capacity of engineering services in the Majura Valley.
- A schedule of requirements for future supply of engineering services based on land use and development scenarios.
- Options for future supply of key engineering services to the area.
- Indication of issues and costs associated with provision of engineering services.
- Outline of planning and environmental considerations associated with the provision of engineering services.
- A staging plan for the provision of engineering services, to inform future planning, capital works and budget bids.
- A description of the flood characteristics of Woolshed Creek, including the identification of flood affected land for a range of recurrence intervals.
- An outline of the potential for Water Sensitive Urban Design.

Table 8 (on Page 19) illustrates possible (preliminary) development scenarios for each of the Investigation Areas as indicated by ACTPLA.

1.1 Report Structure

This report has been structured to chronologically include the steps undertaken in completing the MVES, culminating in the production of this draft report. The steps include:

- Background and key information sources
- Stakeholder consultation
- Overview of existing services, including flood investigation of Woolshed Creek
- Planning framework
- Review of constraints and opportunities
- Servicing strategy
- Water sensitive urban design
- Staging strategy
- Costing
- Appendices (A, B, C and D) containing detailed information for each Investigation Area.

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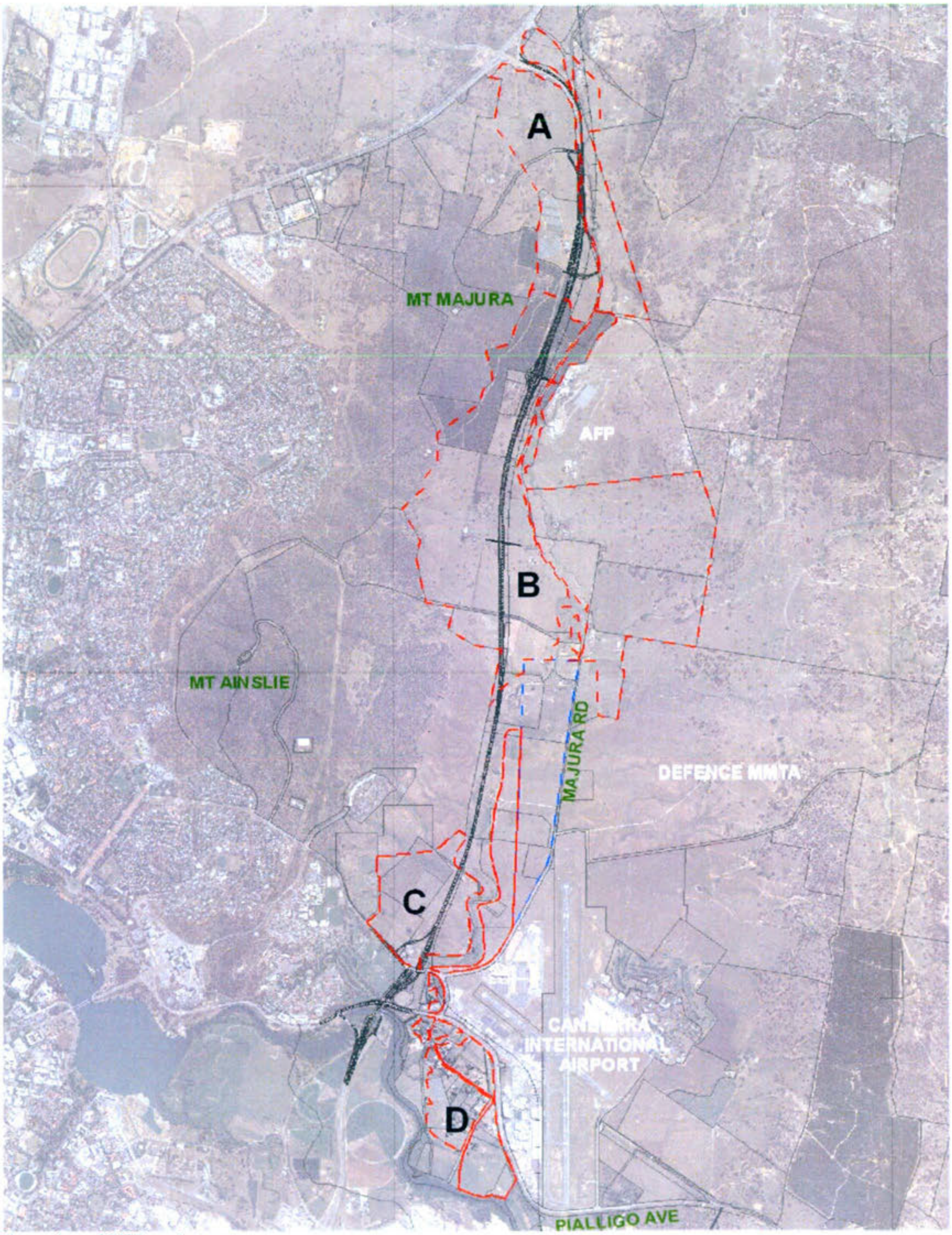

Figure 1 MVES study area

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2.0 Methodology

The sequential steps undertaken by AECOM as part of the MVES are outlined below in Figure 2 and described in more detail in the following sections.

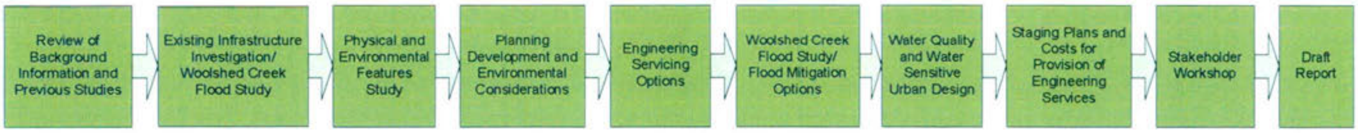

Figure 2 MVES methodology

2.1 Context and Site Description

The Canberra Spatial Plan (released in March 2004) identified three major employment corridors to meet the future employment and industry needs for the ACT economy. One of these corridors (identified as the Eastern Broadacre study area) was identified for the growth of industrial, broadacre, commercial, tourism, recreation and transport related activities. The study area intersects with the Canberra International Airport and Fyshwick, and enjoys access to the Federal and Hume Highways via the Monaro Highway and Majura Road (which already functions as a major north-south link) without the need to travel through central Canberra.

In early 2009, MacroPlan completed a preliminary investigation into the opportunities for employment uses in the Eastern Broadacre study area. The purpose of this study was to identify likely future demand for employment land in the ACT and provide advice on potential areas of further investigation and land uses in the study area.

Following the completion of the Eastern Broadacre Planning Study, a number of areas were identified within the Majura Valley for future development as part of the planning for the eastern corridor for employment and commercial land uses. As part of this planning process, AECOM was engaged by ACTPLA to complete more detailed investigations into four specific Investigation Areas within the valley. Specifically, AECOM was tasked with preparing servicing strategies for these specific Investigation Areas, taking into account existing planning, physical and environmental constraints.

2.2 Background and Key Information Sources

2.2.1 Heritage Assessment

The identification of heritage constraints for the feasibility study was drawn primarily from the desktop assessment report prepared by Navin Officer Heritage Consultants for the EPBS. This report relied on a range of information sources, including information held by the Heritage Unit of the ACT Department of Territories and Municipal services, the Australian Heritage Database, the National Trust of Australia, published books and monographs, and other unpublished reports and relevant material for the study area. As such, there are a number of heritage items identified that have not been listed in statutory heritage registers. The ACT *Heritage Act 2004* recognises and protects natural and cultural heritage places and objects. This involves places and objects of both European and Aboriginal heritage significance, and may also include the protection of relevant sites not listed on any statutory register.

2.2.2 Biodiversity Assessment

The development of biodiversity constraints for the feasibility study draws heavily on the report prepared by David Hogg Pty Ltd for the EPBS, but also includes relevant material derived from the Majura Parkway Environmental Impact Statement (EIS), and other relevant material published by the Department of Territories and Municipal Services (Parks Conservation and Lands), and the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA). In some areas, for instance where fieldwork was specifically carried out for the Majura Parkway EIS, the biodiversity constraints are presented with a very high degree of confidence, in both the detail and currency. The assessment prepared by David Hogg Pty Ltd however, was primarily a desktop review of ecological constraints, and as such, there are certain limitations that need to be placed on the reliability of these

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constraints. In general terms, constraints have been presented from a measured and conservative perspective; however the completion of more detailed ecological fieldwork will add a greater degree of confidence in understanding the relevant biodiversity constraints, within the Investigation Areas currently under investigation.

2.2.3 Eastern Broadacre Economic and Strategic Planning Direction Study 2009

The *Eastern Broadacre Economic and Strategy Planning Direction Study* (EBPS) was prepared by Macroplan for ACTPLA to investigate likely future demand for employment land in the ACT and provide advice on potential Investigation Areas and land uses in the study area. The study identifies ten employment investigation areas, including Investigation areas A, B, C and D which form the subject of this report.

In relation to Investigation Area A, the EBPS provides that development within this area needs to be controlled and land uses confined mainly along Majura Road to ensure protection of the rural landscape character and of the major approach into the ACT. The EBPS further identifies large sections of threatened woodland within the upper Majura Valley. However, it is noted that much of this is located on the gentle slopes above the valley floor or within the Majura Training Area (MTA). The EBPS recommends that Investigation Area A would be most suitable to tourism or recreation uses due to its role in forming a significant arrival corridor into Canberra. The majority of lands within the Investigation Area are subject to long-term leases. ACTPLA has indicated that employment development in this area is unlikely. The area will probably be maintained under a broadacre zone under the Territory Plan to protect its landscape and environmental values.

In relation to Investigation Areas B and C, the EBPS notes that a number of threatened species and habitat were identified in these areas and ecological issues would require further consideration in relation to future development of the land. The EBPS also recommends that further study be undertaken in Investigation Areas B and C in relation to the combined impacts of flooding in Woolshed Creek, the Molonglo River and Jerrabomberra Creek. Heritage and visual issues also require further examination to more accurately establish the capability of the land for future urban development. The EBPS also recommends further consideration be given to the timing of servicing of the Eastern Broadacre area to facilitate future urban development. The current study seeks to address these issues, specifically in relation to the provision of utilities and services.

In relation to Investigation Area D, also identified as the Pialligo Investigation Area, the EBPS notes that this area is currently a uniquely peri-urban fringe suburb. Due to the central location of the Investigation Area, the EBPS recommends consideration of this Investigation Area as a campus style business park and/or tourism Investigation Area, which could link in and complement the types of uses within the airport land. However, due to the presence of medium to long term leases in the area this is unlikely to be considered until the long term (2031 onwards). The most likely scenario for this area is to retain and enhance its current character. The Molonglo River is identified as requiring further investigation to determine flooding risk on surrounding land and future studies may identify the need for flooding and drainage works to accommodate additional land supply for employment purposes. A flood study of the Molonglo River is currently being undertaken by another consultant, but was not completed at the time of this report.

2.2.4 Canberra Airport Master Plan

The Canberra Airport Master Plan (2009) provides a vision for growth of the airport over the next 20 years. The Master Plan acknowledges the location of the Airport as being on the East-West Transport Corridor as defined in the National Capital Plan and on the major East-West Employment Corridor, which contains 70% of Canberra's employment. The majority of land north and south of the Airport is used for broadacre purposes, as it is over flown by aircraft and has an historical association with Defence activities. The land to the north and south is denoted as a new Employment Corridor in the Canberra Spatial Plan.

The Master Plan reinforces the role of Canberra Airport as the only curfew-free airport located between Brisbane and Melbourne, as well as its increasing role as an airfreight hub. The Master Plan seeks to respond to the needs of community and business and predicts the continued investment in aviation infrastructure, including a new integrated domestic and international terminal, runway, apron and taxiway upgrades and improvements to the Airport's navigation aids. The withdrawal of Defence facilities from Fairbairn in 2004 and inclusion of such facilities as part of the Airport lease has increased opportunities for civil aviation and commercial expansion on the eastern side of the Airport.

The Airport is located adjacent to Investigation Area D, which is given short-term priority for development as an employment corridor, to interact with the existing East-West Employment Corridor. Development of Investigation

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Area D as an employment corridor would be further supported by the potential expansion of the Airport and the diversification of industry and economic growth occurring on the Airport site.

The Master Plan includes potential links with the surrounding existing and future proposed transport network such as the Very High Speed Train (VHST).

2.2.5 Majura Parkway

The Majura Parkway is a four lane, dual carriageway road extending for approximately 11.5 kilometres through the Majura Valley. The Parkway is expected to be an important north-south link, catering for growing traffic as a result of the development of surrounding areas. The road would be a dual carriageway separated by medians of varying width within an average corridor of approximately 40-50 m. The proposed route of the road bisects the study area. Works associated with the initial stages of the Majura Parkway have commenced, and an EIS has been lodged for public comment.

The EBPS notes that due to capacity issues along other telecommunications corridors, it would be necessary to consider including a telecommunications corridor within the road reserve of the proposed route for the Majura Parkway.

2.2.6 Very High Speed Train

There is potential for a Very High Speed Train (VHST) service to be constructed between Sydney, Canberra and Melbourne with the proposed alignment bisecting the study area, adjacent to the route of the Majura Parkway. This project was put on hold in the late 1990s but is still identified in The Canberra Spatial Plan and The Sustainable Transport Plan as a potential project and has thus been taken into consideration.

2.3 Liaison with Stakeholders

AECOM liaised with stakeholders throughout the study, in the form of meetings, electronic communication, and formal presentations. Key stakeholders included Australian Federal Police (AFP), Department of Defence, Roads ACT, and service authorities.

2.3.1 Australian Federal Police

ACTPLA and AECOM met with the AFP on 01 December 2009, to discuss the infrastructure study and the adjacent AFP property. The following dot points summarize key discussion items with AFP.

- AFP currently treats their sewage on site, but they would prefer to connect into a gravity trunk sewer if one is extended north.
- AFP voiced concerns regarding the alignment of the future Majura Parkway and the VHST. However, this project is currently being designed by another consultant, and it is outside AECOM's scope of works.
- AFP has a ten year development program to increase personnel, which will have an increase on GFA as well. Future personnel numbers have been taken into account for demands on future infrastructure. The master plan has been approved by NCA.
- AFP's data storage centres have high energy usage.

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2.3.2 Department of Defence

ACTPLA and AECOM met with the Defence on 12 December 2009, to discuss the infrastructure study and the adjacent Defence property. The following dot points summarize key discussion items with Defence.

- Expansions to Camp Blake are planned. No expansion is planned beyond the existing Camp Blake footprint. Defence advised their future development will be used by Defence on Defence land – no connections to future infrastructure.
- Woodlands and grasslands overgrazing by kangaroos are an issue.
- Possibility of noise complaints from potential developments due to proximity of grenade range and artillery practice. The range is used by all service branches, AFP, and other agencies.
- A Defence owned rising main connects to ActewAGL infrastructure downstream.
- Site visit by AECOM to inspect Woolshed Creek (including tributaries) and interface between ACT and Defence land.

2.3.3 Roads ACT

AECOM met with Roads ACT on 09 December 2009 to discuss the Majura Parkway project. The following dot points summarize key discussion items with Roads ACT.

- The final EIS will soon be lodged and made available for public comment.
- Several alignment options for Majura Parkway were considered, with three being discussed in detail.
- It is planned that the VHST will be located parallel to Majura Parkway.
- The existing Majura Road will become a service road to access adjacent properties.
- It will likely be five years before construction of Majura Parkway begins. The planning process needs to be completed, acquisitions with Defence sought, and NCA approvals obtained.

2.3.4 Service Authorities

Each of the service authorities noted below were contacted individually regarding existing services and future servicing strategies.

- TaMS – stormwater
- ActewAGL – water and sewer
- ActewAGL - electricity
- Jemena - gas
- Telstra - telecommunications
- TransACT - telecommunications
- ICON – telecommunications

2.3.5 Stakeholder Consultation

A formal presentation to stakeholders was held on 30 March 2010. The purpose of the presentation was to provide service authorities and government agencies with an update on the progress of the study, and to obtain feedback for incorporation into this report.

2.3.6 National Capital Authority (NCA)

A representative from NCA attended the Stakeholder Consultation held on 30 March 2010. A follow-up email was sent to ask if NCA had any additional comments or concerns regarding the project. No further correspondence was received from NCA.

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3.0 Overview of Existing Services

Sections 3.1 through 3.5 provide an overview of the existing services infrastructure for the entire project area. More detailed information, including maps, applicable to each Individual Investigation Area is included within the corresponding Investigation Area appendices.

An overview of the servicing strategy for the entire project area is discussed in Section 7.0.

Both existing and proposed services are illustrated in Figure 9 (water), Figure 10 (sewer), Figure 11 (gas), Figure 12 (electricity), and Figure 13 (telecommunications).

3.1 Water

Water infrastructure is located within Investigation Areas B, C and D. Campbell (TWL 656) and Upper Hackett (TWL 685) are the nearest reservoirs serving the Majura Valley area. These reservoirs are only capable of supplying areas up to approximately 650 m in elevation. They have spare capacity, but the existing mains from the reservoirs into the Majura Valley do not.

3.2 Sewer

Existing sewer infrastructure (owned and operated by ActewAGL) is located within Investigation Areas C and D. A Defence owned rising main is located in the reserve of Majura Road, adjacent to Investigation Area B.

The existing trunk sewer located within the Majura Valley (Investigation Areas C and D) has been designed to cater for future development within the Investigation Areas. A sewer connection point at a manhole located within Investigation Area C has previously been identified by ActewAGL.

Constraints are imposed by the capacity of the Majura Sewage Pump Station (MSPS) and the Fyshwick Sewage Treatment Plant (FSTP). Investigation Areas A through D will ultimately drain to the MSPS, which then conveys the flow to the FSTP. The MSPS and the adjacent 2.2 ML emergency storage is nearing capacity for wet weather flows. There are no current plans to upgrade the pump station or emergency storage.

The FSTP has a capacity of about 4.5 ML and a total storage tank capacity of 11 ML (above the 4.5 ML FSTP capacity). Flow is held in the storage tank during large wet weather events until it can be treated. The FSTP treats flow from both the MSPS and the Fyshwick Sewage Pump Station (FSPS). Flows from the MSPS are always pumped to the FSTP, while flows from the FSPS can be pumped to either the FSTP or the southern Canberra gravity system. Factors affecting where the FSPS flow is pumped include weather and the amount of effluent required for the North Canberra Effluent Reuse Scheme (NCERS).

Plans are in development to increase the capacity of the FSTP to 6 ML and the storage capacity to 6 ML. The timing of improvements to the FSTP is not known, but 2031 is the outer limit of current ActewAGL modelling, therefore improvements are likely to occur prior to then.

3.3 Gas

Gas infrastructure within the ACT is maintained and operated by Jemena Networks (ACT) Pty Ltd (Jemena).

A 250 mm diameter high pressure steel gas main is located within the Majura Valley. It crosses Investigation Area A from east to west, and then runs south, parallel to Majura Road to the intersection will Pialligo Avenue. The main ultimately connects trunk receiving stations at Federal Highway and Fyshwick, and the primary regulating stations in Narrabundah and Woden.

3.4 Electricity

Electricity infrastructure within the project area is owned and operated by ActewAGL. Infrastructure is located throughout each of the Investigation Areas in the form of high (11 kV) and low voltage, and underground and overhead. The existing infrastructure does not have adequate capacity to service the potential developments.

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3.5 Telecommunication

There are several telecommunications providers which service Majura Valley. Those located within and adjacent to the Investigation Areas include Telstra and Optus. TransACT is another provider, although they do not have infrastructure present in the project area. ICON and Intact are government owned carriers which only supply services to ACT and Commonwealth facilities, including schools.

Telecommunications infrastructure (primarily Telstra) is located within Investigation Areas A, B, and D, and adjacent to all Investigation Areas.

3.5.1 TransACT

No TransACT infrastructure is located within the development. The nearest infrastructure for Investigation Areas A and B is located in Dickson, and for Investigation Areas C and D Campbell.

3.5.2 Telstra

The Sydney Melbourne-Gundaroo low/ high integrity data cable crosses north –south through Investigation Areas A and B. Additional Telstra infrastructure is located within Investigation Areas A and B, and adjacent to Investigation Areas C and D.

3.5.3 ICON

ICON infrastructure is located adjacent to the southern boundary of Investigation Area C.

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4.0 Stormwater Majura Valley Flood Study

4.1 Description of Existing Catchment

The stormwater catchment for the Majura Valley (refer to Figure 3) is defined by the topography from the Federal Highway to the Molonglo River and by the hills either side of Woolshed Creek. The total catchment of the study area is approximately 6450 ha. The catchment was divided into several sub catchments using 2 m interval contours provided by ACTPLA. The catchment is mostly undeveloped land with some areas of pine plantation. Some of the catchments are modified for cultivation. The catchments are steeper along Mount Majura and Mount Ainslie boundaries with slopes ranging from 5 – 20%. The average catchments slopes are 1% to 2% in the valley adjacent to Woolshed Creek.

4.2 Background Information

Previous studies and reports were reviewed as part of this study. A key source of information included GHD's *Majura Precinct Flood Study* (September 1998). The objective of GHD's study was to "identify and document the extent of flooding in the area to be developed for the Majura Precinct and in particular the Environmental Technology Development Zone (ETDZ)."The ETDZ was comprised of areas along the western side of Majura Road and in the Southern area of the Majura Valley. Both XP-RAFTS and HEC-RAS software were used to model stormwater flow within the catchment.

4.2.1 GHD Study Inputs

- *Topographic land use and creek details used as inputs in GHD's study included the following:*
- *1:10,000 Planning Series Maps which include contours at 5 m intervals, general land use, roads, building outlines, water courses and other pertinent information;*
- *Digital based mapping information which includes the above information as well as contours at 2 m intervals (supplied by the ACT Land Information Centre); and*
- *1:10,000 aerial photos (1997).*

No detailed survey or cross-section survey was available at the time of the study. Cross section information (A3 figures) taken as part of a 1978 study at approximately 400 m intervals were utilized – the original survey information was not available.

4.2.2 GHD Study Conclusions

Conclusion included in GHD's report, relevant to the MVES included the following:

- *The 100 year ARI flood levels in the Molonglo River were found to have no impact on the nominal ETDZ sites.*
- *The Majura Valley transport corridors have not been finalised to-date. However, preliminary planning for the corridor would indicate that the transportation options are unlikely to have a major impact on increasing flooding in Woolshed Creek. In particular, the corridors are likely to be located to the west of the creek and clear of the 100 year floodplain in the area of the western ETDZ sites.*
- *The accuracy of the flooding constraints nominated in this report is limited by the lack of detailed survey information available. Therefore, additional detailed survey will be required before the flooding constraints can be further refined to provide a greater level of reliability.*

4.3 Investigation Inputs

The following inputs were used as part of the MVES stormwater investigation:

- Background studies, such as GHD's *Majura Precinct Flood Study* (September 1998)
- Surveyed cross sections of Woolshed Creek carried out 20 m from the top of bank on both sides of the creek at 50 m intervals.
- 2 m contours supplied by ACTPLA.
- Aerial photo (2009) and cadastral information supplied by ACTPLA.

The surveyed cross sections were used together with the 2 m contours to produce a three dimensional surface which was utilised in developing the XP-RAFTS and HEC-RAS models. Information obtained from site visits and engineering judgement was used to fill in any gaps in information.

4.4 Design Standards

TaMS' Design Standards for Urban Infrastructure (DSUI) were a key reference for the stormwater aspects of this study. The information regarding rainfall loss rates and surface run-off routing (Tables 1.6 and 1.7, Page 1-13 of DSUI) which were used as modelling parameters in XP-RAFTS.

4.5 XP-RAFTS Modelling

4.5.1 Existing Conditions

The XP-RAFTS 2009 computer model was used to estimate the catchment flows for 100 year ARI storm durations. The data required to generate the hydrographs in individual sub catchments is:

- Catchments area
- Average vectored slope
- Surface roughness
- Degree of urbanisation
- Loss rates
- Observed or design rainfall

The 2 m interval contour map and the cadastre information provided by ACTPLA were used to define the catchment boundaries, and to calculate the vectored slopes of individual catchments. Sub-catchment boundaries were primarily defined by tributaries and ridges on either side of Woolshed Creek to the point where the flows are required. The investigation areas are located both sides of Woolshed Creek and are defined as sub-catchments. The larger natural sub-catchments upstream of the investigation areas are defined by the tributaries and ridges.

Modelling parameter input into XP-RAFTS included the following:

- A 5% impervious area was assumed for most of the sub catchments with the surface roughness value of 0.05.
- The initial and continuous loss model is adopted, with 15 mm initial loss and 5 mm continuous loss.
- The Intensity-Frequency-Duration data recommended in TaMS' Design Standards for Urban Infrastructure is used for observed or design rainfall.
- An average velocity of 1.5 m/s is adopted to estimate lag time between sub-catchments and the HEC-RAS model flow velocities of Woolshed Creek is compared wherever applicable.

Peak flows estimated from the XP-RAFTS modelling software are summarised in Table 4.

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Table 4 Peak stormwater flows – 100 year ARI existing conditions

Catchment ID	Area (ha)	Vectored Slope (%)	Discharge (m^3/s)	Duration (min)
A	226.75	2.2	11.40	120
B1	131.15	6.0	11.45	60
B2	163.70	8.0	15.70	60
B	-	-	32.15	180
C1	158.73	6.5	13.90	60
C2	63.80	4.0	5.35	60
C	-	-	47.90	180
D1	699.24	2.3	27.70	180
D2	101.05	11.50	12.55	60
D3	159.74	0.75	32.75	180
D	-	-	76.75	180
E1	191.65	2.5	10.60	120
E2	197.50	2.6	11.05	120
E	-	-	96.16	180
F	80.33	1.9	99.90	180
G1	105.85	0.70	42.95	120
G2	365.30	2.85	18.70	120
G3	442.65	2.60	20.80	120
G4	85.40	2.80	5.80	120
G	-	-	146.05	180
H1	400.60	0.5	47.05	180
H2	544.80	2.5	23.85	120
H3	333.60	2.30	15.65	120
H4	138.60	3.0	10.40	180
H	-	-	195.20	180
I	258.20	3.0	204.60	180
J	130.45	1.40	208.40	180
K2	300.65	0.5	19.0	120
K1	228.04	3.20	13.62	120
K	233.520	0.45	213.35	180
L-1	197.95	0.5	43.30	90
L	118.660	1.5	236.75	180
M	194.70	2.65	240.585	180
N	195.120	2.5	244.80	180

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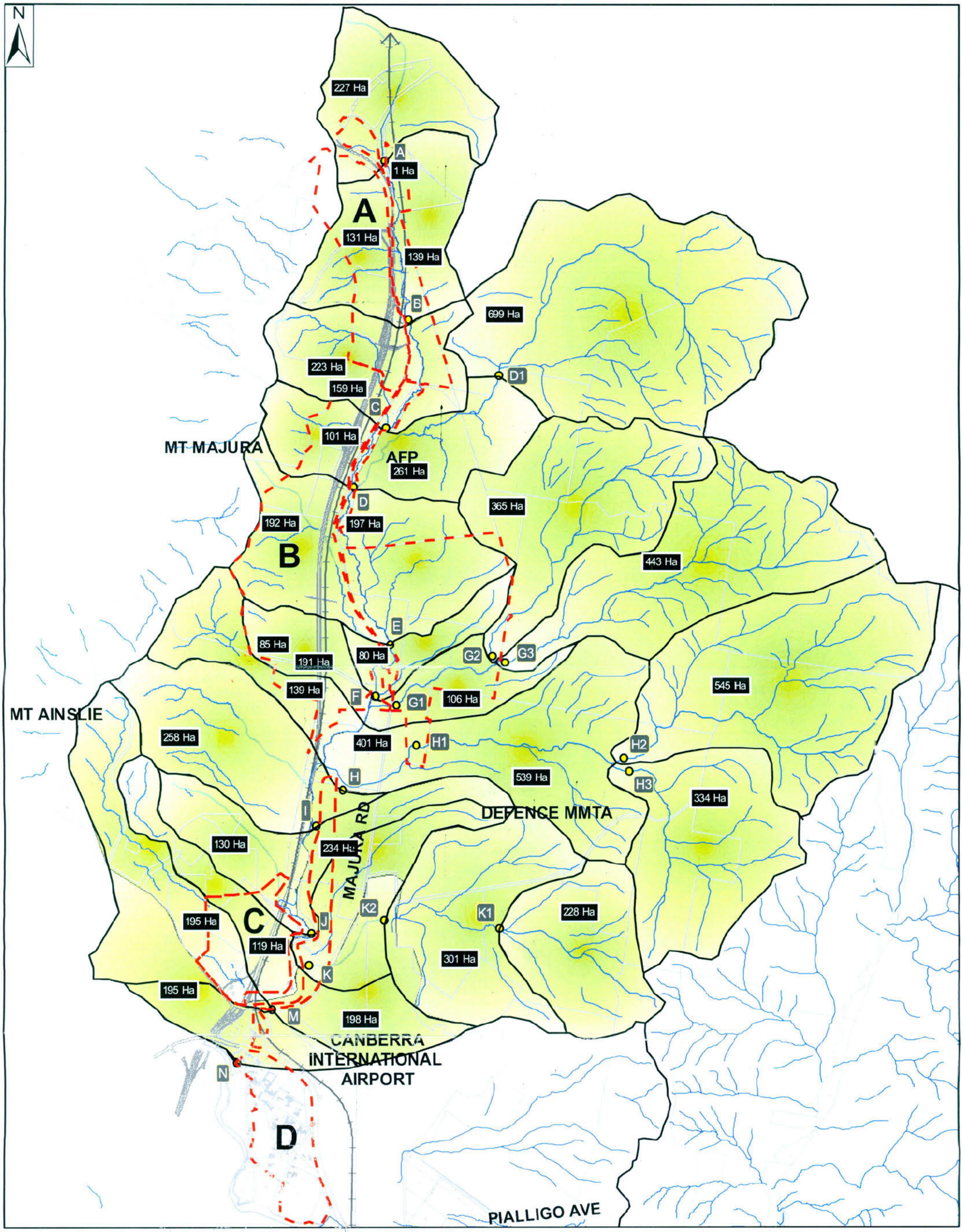

Catchment Node

Catchment boundary

Stream

Proposed Majura Parkway & VHST Route

Investigation Area Boundary

MAJURA VALLEY ENGINEERING FEASIBILITY STUDY

CATCHMENT PLAN

Source: ACTPLA (2009), SMEC (2009)

0 0.5 1 2 km

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4.5.1.1 Comparison with Previous Studies

Table 5 compares the XP-RAFTS results described in the previous section with those obtained as part of the 1998 study by GHD.

Table 5 XP-RAFTS Results Comparison

Description	100 year ARI Flow at Outlet
XP-RAFTS (AECOM 2010)	245 m^3/s
XP-RAFTS (GHD 1998)*	265 m^3/s

*A vectored slope value between 1 to 15%, and a percentage Impervious area of 0 to 3% was used.

The 100 year ARI flow at the downstream end of the catchment was found to be approximately 20 m^3/s less than was determined as part of the 1998 GHD study. The reasons for this difference include:

- The 3D triangulation model of the study area with 2 m interval digitised contours is used to calculate the average vectored slopes of individual catchments in 12D. The average vectored slope of the individual catchments mostly in between 0.5 to 3.0% is found in the calculations. The reduction in average vectored slope will lead to reduction in flows from individual sub catchment.
- Sub catchments areas are treated as obeying non-linear storage relationship in RAFTS. The sub-catchments areas are left larger, where there are potentially minor developments, and defined by tributaries and ridges for allowing more initial /continuous losses in this study. This process will lead to reduction in flows from individual sub-catchments.

4.5.2 Developed Conditions

The ARBM loss model parameters recommended in ACT Urban Services guidelines is used in sub catchments that comprise the investigation areas in Precinct B, C and D. It has been assumed that 60 percent of the developable land in these precincts will have 90 percent of impermeable area. The surface roughness values of 0.04 and 0.015 are used in sub-catchment areas for permeable and impermeable areas respectively.

The comparison table for pre and post development at key nodal points is summarised in Table 6.

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Table 6 Peak stormwater flows – 100 year ARI developed conditions

Catchment ID	Pre development Discharge (m^3/s)	Duration (min)	Post development Discharge (m^3/s)	Duration (min)
A	11.40	120	11.40	120
B	32.15	180	32.15	180
C	47.90	180	47.90	180
D	76.75	180	76.75	180
E	96.16	180	94.70	180
F	99.90	180	97.70	180
G	146.05	180	140.95	180
H	195.20	180	190.45	180
I	204.60	180	200.30	180
J	208.40	180	204.40	180
K	213.35	180	226.50	180
L	236.75	180	233.40	180
M	240.59	180	240.60	180
N	244.80	180	242.75	180

The proposed developments are both sides of Woolshed Creek and the sub catchments drain directly into the Creek. Due to the size of the upstream catchments, the peak flow from the developed areas will reach the creek before the peak flow from upstream catchments and therefore does not have any impact on the overall peak flows in the creek. This is illustrated by the 100 year ARI flow hydrograph for existing and developed condition that show that there is a slight reduction in peak flows as the increase impervious ratio reduced the lag time to peak (Refer Figure 4, Figure 5and 5 and Table 6)

The existing condition peak flows were adopted in hydraulic modelling of Woolshed creek as the flows reduced slightly under developed conditions.

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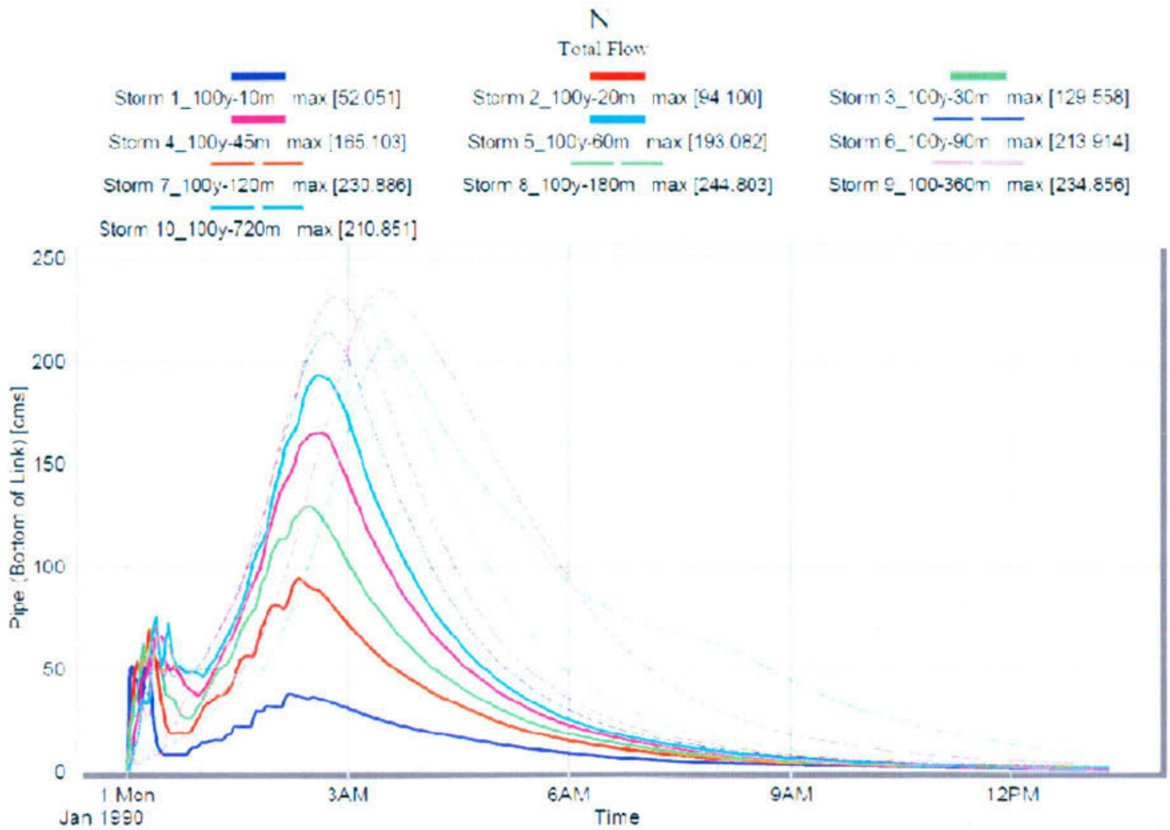

Figure 4 Existing condition flow characteristic for 100 year ARI at Node M

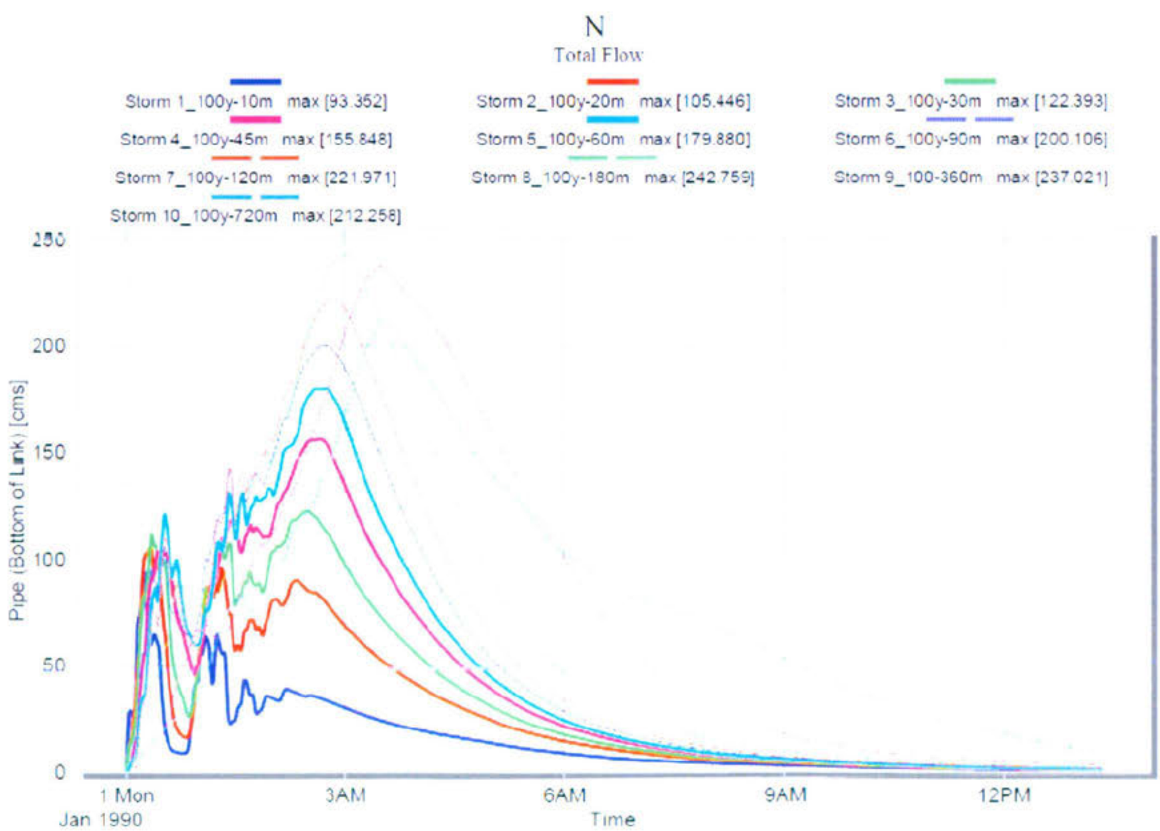

Figure 5 developed condition flow characteristic for 100 year ARI at Node M

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4.6 HEC-RAS Flood Modelling

4.6.1 Existing Conditions

The 100 year ARI flood levels are modelled in Woolshed Creek using HEC-RAS. Field survey was carried out 20 m from the top of the banks on both sides of the creek at 50 m interval using GPS. The field data survey and the 2m contour information provided by ACTPLA were used to create a three dimensional terrain model in 12D. The creek cross sectional data is transferred from the terrain model to HEC-RAS and one dimensional steady follow hydraulic analysis is carried out with the following design parameters. The 100 year ARI flood level cross sectional data is transferred to GIS and flood plain mapping has been completed, and is illustrated in Figure 6.

HEC-RAS input parameters are included in Table 7.

Table 7 HEC-RAS input parameters

Parameter	Value
Manning's Value	
• Left and Right Over Bank	0.04
• Main Channel	0.05
Contraction Co-efficient	0.1
Expansion Co-efficient	0.3

4.6.2 HEC-RAS Modelling Limitations

Field survey cross sectional data

The 100 year ARI flow width is more than the creek cross sectional width surveyed. The field data survey and the 2m contour information provided by ACTPLA were used to create a three dimensional terrain model in 12D. However, there are level differences in field survey cross sectional data and the 2m interval contours provided by ACTPLA. There are low points and erosion gullies within the creek and the 100 yr flood plain area that are not represented in 2m interval contours. Some interpolation of the ground conditions has been necessary to generate HEC-RAS cross sections.

There is stretch of 550m existing (CH 350 to 900) creek was not surveyed due to the presence of water in the creek. The topography of this stretch is interpolated with the field survey and the cadastral information.

One Dimensional Flow Analysis

The existing creek is narrow and has several bends. There is a two dimensional flow within the creek as the 100 year ARI flood is flow over the creek bank at these bends. This action cannot be modelled in HEC-RAS as it is only capable of doing one dimensional hydraulic modelling.

The existing creek channel has an average width of 25m at the top of the bank. The average creek depth from the top of the bank is 2m and during the 100 yr storm event this depth increases to 3m with an approximate flow width of 200m in the worst case.

Bridge Details

There are two bridges crossing the Woolshed Creek within the study area and the bridges have been modelled with the available bridge data. There is no detailed survey data available on bridge upstream and downstream chord and cross sections.

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4.7 Stormwater Detention

TaMS' DSUI state that post-development stormwater flow must be less than or equal to pre-development flow for each development. The potential development scenarios and construction of Majura Parkway will significantly increase the area of impervious surface, and therefore run-off from the local catchments along the creek. The design consultant (SMEC) for the Majura Parkway has advised that stormwater detention and water quality will be included as part of the parkway design, but the design has not yet progressed to that stage.

WSUD and stormwater detention for the potential development scenarios located within the Investigation Areas are discussed in more detail within the relevant appendices. It is anticipated that the proposed WSUD measures will provide both stormwater treatment and detention.

4.8 Further Investigations

- As the proposed developments will have storm water drainage system with roads, pits and pipes and lined floodway, the peak flow values will be higher than the calculated values from the RAFTS modelling with the shorter time of concentration. Detailed catchment studies have to be carried out for specific development scenarios and retarding basins should be designed in the detailed design stages of the proposed development
- Detailed field survey has to be carried out to 250 m either side of the entire creek up to Molonglo River and the design information from Majura Parkes Way is to be incorporated to create a three dimensional terrain modelling. Bridge details have to be surveyed to facilitate future hydraulic modelling. Further investigations have to be carried out on filling the existing erosion gullies and localised flood plains to increase the developable areas.
- Two dimensional hydraulic modelling has to be carried out if there are no modifications to the existing creek. If there is any future plans to modify the excising creek geometry by eliminating the sharp bends to increase the developable area, one dimensional HEC-RAS modelling can be carried out on realigned Woolshed Creek.
- As previously discussed, a flood study of the Molonglo River is being undertaken by another consultant, and results were not available during the preparation of this report. ACTPLA advised that tail water levels from a study by Ecowise in 2000 of the Molonglo River should be used. From the information provided we have used a tail water level of RL560.5 as part of the HEC-RAS study. The HEC-RAS results should be verified once the Molonglo study is complete.
- TaMS has advised that a flood study of Pialligo Brook (located within Investigation Area D) is currently being undertaken. The potential development scenarios should be reviewed and constraints updated if necessary once the results of the flood study are made available.

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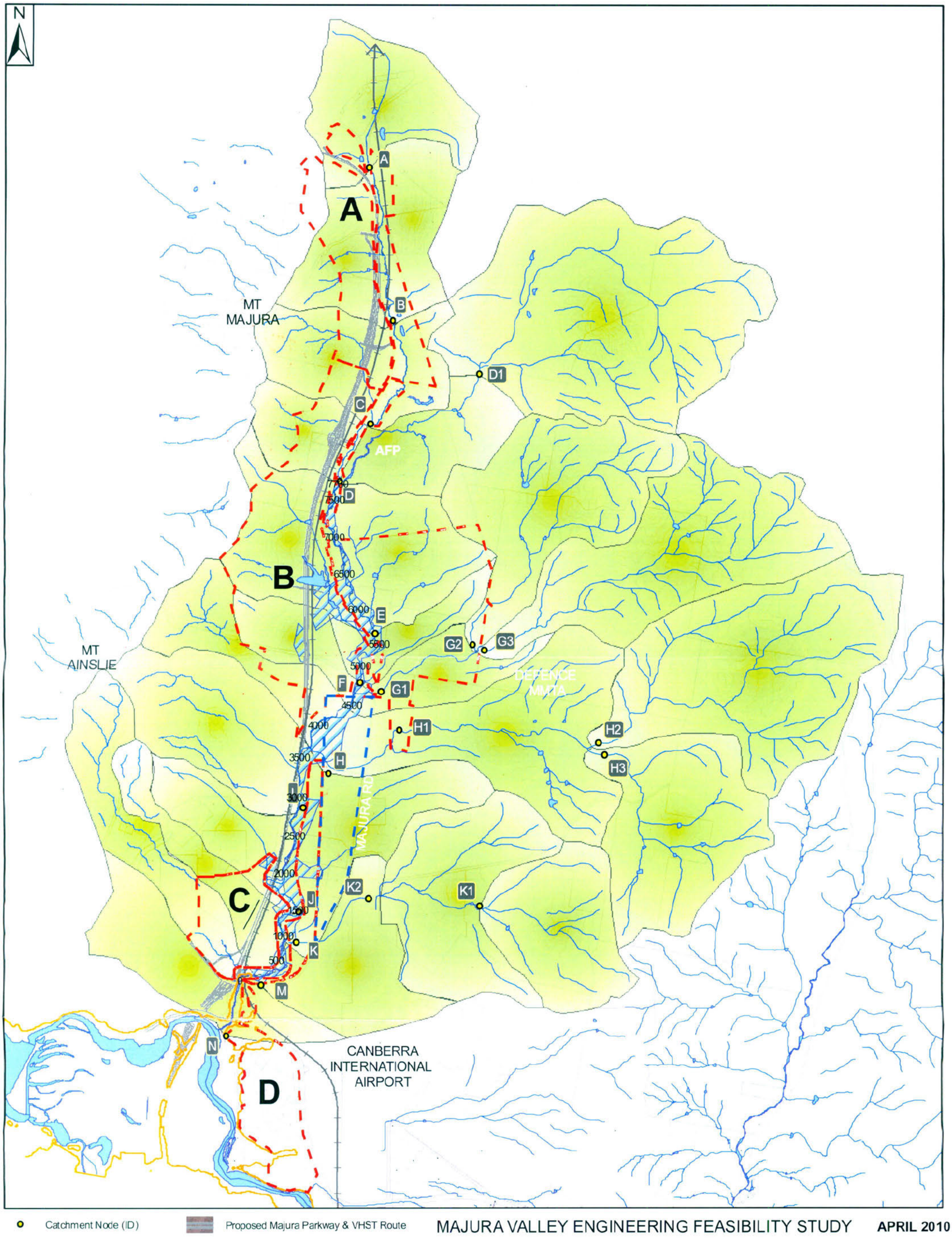

Catchment Node (ID)
560.5m (1:100 Year Floodline)
Drainage Line
Chainage (m)
100yr ARI
Sub-catchments
Proposed Majura Parkway & VHST Route
National Land
Investigation Area Boundary

MAJURA VALLEY ENGINEERING FEASIBILITY STUDY

WOOLSHED CREEK FLOOD STUDY

Source: ACTPLA (2009), SMEC (2009)

0 0.5 1 2
km

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4.3 Investigation Inputs

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Modelling parameter input into XP-RAFTS included the following:

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L-1	197.95	0.5	43.30	90
L	118.660	1.5	236.75	180
M	194.70	2.65	240.585	180
N	195.120	2.5	244.80	180

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5.4 Approvals Process

5.4.1 Structure Plans and Rezoning

The current zoning of the Investigation Areas under the TP is Broadacre. Specific land uses and permissibility is described for each area in more detail in the appendices. Based upon the EBPS and identification of areas for potential future employment land uses, such as industrial/ commercial, a variation to the TP to change the current zoning would be required in the form of a Structure Plan for the area. The Structure Plan would identify the future land uses under the TP and set out principles and policies for development of the area.

Following the Structure Plan, a Concept Plan may be prepared for individual precincts within the study area, applying the principles and policies of the Structure Plan. A Concept Plan is adopted as a Planning Guideline or Precinct Code under the TP against which development within that precinct would be assessed. The Concept Plan would further refine notional land use, broad infrastructure requirements (in line with the outcomes of the feasibility study), higher order road network, key features and boundaries of the 'estate'.

At a more detailed level, at development application stage, an Estate Development Plan (EDP) may be prepared setting out the detailed development proposal for the 'estate' consistent with the Concept Plan and other relevant codes. The EDP must contain block boundaries and proposed zoning and may also include design and construction requirements for infrastructure works, landscaping and reticulated works.

Mechanisms for securing the types and locations of infrastructure (including WSUD infrastructure) as identified in this feasibility study for the area exist at all levels of the planning process, including broad structure planning, Concept Plans and EDPs. Requirements for appropriate provision of infrastructure and services, including WSUD treatments are already included in many precinct codes, development codes and general codes under the TP.

At a high level, principles around infrastructure/servicing and WSUD can be included in a Structure Plan, for example:

"Water sensitive urban design principles will be adopted at all levels of the development (block, neighbourhood, catchment) to minimise potable water consumption and manage water quality" (ACTPLA, Molonglo and North Weston, 2008).

Concept Plans contain planning principles to be applied to future development proposals and can include those related to infrastructure/servicing and WSUD as contained in the Ngunnawal 2C Concept Plan:

"Water sensitive urban design principles are to be adopted to secure economic, social and environmental benefits and to assist in achieving the targets identified in the 'Think Water Act Water' strategy for sustainable water use in the ACT."

Concept Plans often contain an overview of existing utilities and services in the study area and make recommendations around the types of additional and/or upgraded infrastructure required to facilitate the proposed development. The information contained in this feasibility study would therefore inform the preparation of a Concept Plan for the area and would include detail and maps as relevant and required to identify the types and location of infrastructure, including specific WSUD treatments necessary to facilitate the chosen development scenario. This would then be reflected in any EDP/development application prepared for the Concept Plan area as these are required to be consistent with the adopted Concept Plan.

It is the Concept Plan stage that provides an opportunity to implement the outcomes of this study, leading into the preparation of an EDP. The Concept Plan approach would establish the framework for the implementation of infrastructure and services in the study area.

At a more detailed level, codes used to assess development applications and supporting EDPs already include requirements for consideration of infrastructure and servicing and many contain outcomes or performance based controls against which these proposals are assessed. The TP includes the *'Waterways Water Sensitive Urban Design General Code'* which sets detailed requirements for development in relation to WSUD. Further, development codes contain specific elements related to infrastructure and servicing and WSUD, using a range of outcomes focused rules and criteria to encourage best practice in this regard. For example, the Industrial Zones Development Code includes the following mandatory requirement in relation to WSUD:

Evidence is provided that shows the development achieves a minimum 40% reduction in mains water consumption compared to an equivalent development constructed in 2003 using the ACTPLA on-line assessment tool or another tool as included in the Water-Ways: Water Sensitive Urban Design General Code. The 40% target *is met without any reliance on landscaping measures to reduce consumption.(ACTPLA, Industrial Zones Development Code, January 2010).*

Outcomes focussed conditions of approval could also be used to maximise the benefits of WSUD treatments, utilising recognised water quality standards as performance indicators to encourage innovation in the achievement of best practice in terms of water quality and consumption.

5.4.2 Development Application and Assessment

For development within Designated Areas under the NCP, an application would be required to be submitted to the National Capital Authority for approval. Public notification may be required by the National Capital Authority where it is of the opinion that facilities within Designated Areas will create a high visual impact.

For works on Territory Land, approval would be required under the *Planning and Development Act 2007*. A development application would need to be lodged with the ACTPLA for assessment and determination.

The proposed infrastructure works would be subject to merit track assessment and approval cannot be granted for development proposals in this track unless the proposal is consistent with:

a) *the relevant code; and*

b) *if the proposed development relates to land comprised in a rural lease any land management agreement for the land; and*

c) *if the proposed development will affect a registered tree or declared site the advice of the conservator of flora and fauna in relation to the proposal.*

The application would be publicly notified in accordance with the Regulations and may also be referred to relevant entities for comment.