

Fire Protection and Water Supply Plan

Lot 1 DP 109606

Princes Highway, Frogshollow

25 October 2017

Prepared for:

Sport Aviation Australia

P.O. Box 752

NSW 2548

Prepared by:

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Project No. S-518

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Table of Contents

1.0 INTRODUCTION.....	1
2.0 WATER SUPPLY AND QUALITY	1
3.0 RAINFALL WATER BALANCE	2
4.0 RAIN WATER HARVEST	3
5.0 FIRE PROTECTION WATER SUPPLY	4
6.0 REPORT LIMITATIONS.....	5

FIGURES AND TABLES

Figure 1- Site Vicinity Map

Figure 2- Water Supply Concept

Table 1- Typical Water Consumption Per-Capita Values

Table 2- Water Balance Potable and Non Potable Consumption

Table 3- Water Balance Potable Consumption

APPENDICIES

Appendix A- Figures

Appendix E- References

1.0 INTRODUCTION

At the request of Sport Aviation Australia (Client), Tasman Engineering Consultants (TEC) have prepared a plan for fire protection and water supply for Lot 1, DP 109606, Prices Highway, Frogshollow, NSW. The site and vicinity are shown in **Figure 1- Site Vicinity Map, Appendix A**.

The proposed project consists of a recreational flight school to be located at the Frogshollow Airstrip. At full operation the project is proposed to cater to resident occupancy of 360 students and 200 non-resident staff.

The proposed facility includes living accommodations for 10 squadrons of 36 students, kitchen and dining areas, laundry facilities, classrooms, administration, aircraft maintenance and aircraft hangers.

The development of the project is proposed to be carried out over a period of approximately five years and will begin with installation of facilities for two squadrons with an additional squadron added every six months.

2.0 WATER SUPPLY AND QUALITY

The proposed facility will require potable water for drinking, ablutions and food preparation and non-potable water for, laundry, toilet flushing, and firefighting.

A reticulated water supply for the site is currently not available therefore the objective of this plan is to address the required water needs and to explore options for both potable and non-potable water supply.

Drinking water by definition is water suitable for human consumption and would include water that is used for drinking, cooking, and ablutions.

The Australian Drinking Water Guidelines (ADWG) indicate that drinking water is required to be safe to drink. It should contain no harmful concentrations of chemicals or pathogenic microorganisms and should also be aesthetically pleasing in regard to appearance taste and odour. Further the safety of water in public health terms is determined by its microbial, physical and radiological qualities of which the microbial quality is usually the most important.

Based on the above ADWG requirement, all water intended for human consumption should meet demonstrable drinking water requirements. The ADWG outlines both health and aesthetic guideline values.

Water supply options for the site include rainwater gathered from the roof area of the proposed facility structures. Bore water may also be an option however there are currently no groundwater bores located on the property. The availability and access to bore water is presently being assessed by the Client. Bottled water for drinking is also a viable option.

Rainwater is used untreated in many parts of Australia as the primary source of both potable and non-potable water. Similarly untreated bore water is also a common source of drinking water.

The enHealth Guidance on Use of Rainwater Tanks provides a framework for managing water quality, identifying potential hazards and health risks and preventative measures that may be implemented to protect human health.

ADWG also provides a framework for hazard assessment and risk management with respect to water quality from all potential sources including groundwater.

The quality of rainwater or bore water as potable water supply may also be improved by filtration at the tap using a cartage type filtration system.

Total water usage is estimated to be approximately 49,200 L/day based on typical waste water volumes for resident and non-resident occupancies for non-reticulated systems. The NSW septic tank accreditation guidelines indicate that typical water usage is estimated to be approximately 150 L/person /day for residential occupancy and 30 l/person/day for non-residential occupancy. For non-reticulated systems where water saving devices are installed residential usage is typically reduced by 20 percent.

Table 1 summarises a breakdown of typical water usage.

Table 1- Typical Per-Capita Water Consumption Values	
	Per-Capita Consumption (Litres/Person/Day)
Hand basin	8
Kitchen	8
Bath & Shower	40
Laundry	24
Water Closet	40
Drinking	2

Typical values reduced by 20 % in non-reticulated areas with water saving devices.

3.0 RAINFALL WATER BALANCE

The potential water supply from rainwater has been estimated using decile five monthly rainfall statistics taken from BOM Station 069139 located at the BEGA AWS. The rainwater model presumes that the total roof area available for rainwater harvest at project completion will be approximately 27,455 m². The water balance shows a monthly deficit for all 11 months of the year where consumption exceeds the available rainwater harvest from the nominated roof area. The above water balance is summarised in **Table 2**.

Table 2- Frogshollow Flight School Rainwater Balance													
Consumption (l/day)	49200	Total water consumption											
Roof Area (m2)	27455												
Initial storage (m3)	0												
Parameter	Units	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Days per Month	days	31	28	31	30	31	30	31	31	30	31	30	31
Precipitation	mm/month	38.6	45.4	36.2	25	22.8	32.1	16.9	20.8	26.6	30.6	56.4	35.2
Precipitation Input	m ³	1060	1246	994	686	626	881	464	571	730	840	1548	966
Consumption Output	m ³	1525	1378	1525	1476	1525	1476	1525	1525	1476	1525	1476	1525
Deficit/surplus	m ³	-465	-131	-531	-790	-899	-595	-1061	-954	-746	-685	72	-559

A partial remedy for the above deficit may be achieved using recycled water to satisfy the water closet component of the consumption and bottled water to satisfy the drinking water component of the consumption demand. This water balance is summarised in **Table 3** which shows a monthly deficit during a portion of the year which would also require a supplemental supply of water.

Table 3- Frogshollow Flight School Rainwater Balance													
Consumption (l/day)	28080	Total water consumption less non potable and drinking water											
Roof Area (m2)	27455												
Initial storage (m3)	0												
Parameter	Units	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Days per Month	days	31	28	31	30	31	30	31	31	30	31	30	31
Precipitation	mm/month	38.6	45.4	36.2	25	22.8	32.1	16.9	20.8	26.6	30.6	56.4	35.2
Precipitation Input	m ³	1060	1246	994	686	626	881	464	571	730	840	1548	966
Consumption Output	m ³	870	786	870	842	870	842	870	870	842	870	842	870
Deficit/surplus	m ³	189	460	123	-156	-245	39	-406	-299	-112	-30	706	96
Cumulative storage	m ³	189	650	773	617	372	411	5	-295	-407	-437	269	365

Whether the amount of supplemental water could be supplied by groundwater is yet to be determined. Because the supplemental supply would be satisfying the demand for potable water the supplemental supply would be required to meet the appropriate water quality standard.

4.0 RAIN WATER HARVEST

The rainwater collection and storage system shown in **Figure 2** is summarised as follows:

Each squadron block would be equipped with ten (10), 10 KL rainwater storage tanks plus one additional 252 kL storage tank. The main building and carpark would be equipped with a total of six (6), 10 kL storage tanks. Each hangar and maintenance shop would be equipped with two (2), 10 kL storage tanks. The storage network would be interconnected to allow for transfer of water as needed.

The total storage for the facility would be approximately 2,740 kL. Which is a sufficient starting volume to achieve surplus storage throughout the year.

Additional opportunities for rain water harvest may also be available as additional roofed structures are considered as the construction stage of the project progresses.

5.0 FIRE PROTECTION WATER SUPPLY

A BCA fire safety capability assessment has been prepared for the site by GN Consulting. GN Consulting has indicated that AS 2419 compliant fire hydrants and AS 2441 compliant hose reels are required for the work shop and main building and carpark structure. The remaining buildings proposed for the site would require portable fire extinguisher coverage as per the above report.

Based on review of AS 2419 the work shop, main building and carpark structure would each require two fire hydrants. Because the facility is not serviced by a reticulated town water supply the water supply for firefighting would need to be supplied by on site tank storage and delivered by a fire pump set system.

AS 2419 requires that hydrants supplied by on site storage tanks and a fire pump set also incorporate a booster assembly and therefore be capable of delivering 10 l/ s per hydrant for a period of 4 hours.

Based on the above requirements a total volume of 288 kL dedicated firefighting supply would be required. AS 2419 also requires that the water supplied to fire hydrant system storage tanks be capable of refilling 50% of the required tank storage in less than 24 hours.

The proposed facility is also located within a rural fire protection zone which is managed by the NSW Rural Fire Service (RFS). The RFS publication "Planning for Bush Fire Protection 2006" indicates that water supply for firefighting purposes for allotments with an area of 1,000 m² to 10,000 m² require a 10kL dedicated firefighting supply for each allotment. Allotments in excess of 10,000 m² require a 20 kL dedicated supply.

The area of the proposed development in the immediate vicinity of the proposed buildings comprises approximately 5.5 Ha. Based on the above rural fire service supply requirements this would require approximately 70 kL of dedicated water supply which can be supplied by the hydrant tanks discussed above.

Buildings of a size which do not require hose reels, as well as the fuel storage areas adjacent to each hangar may be protected using system of appropriate portable fire extinguishers. Recommendations for portable fire extinguishers are provided in the BCA Fire Capability Assessment.

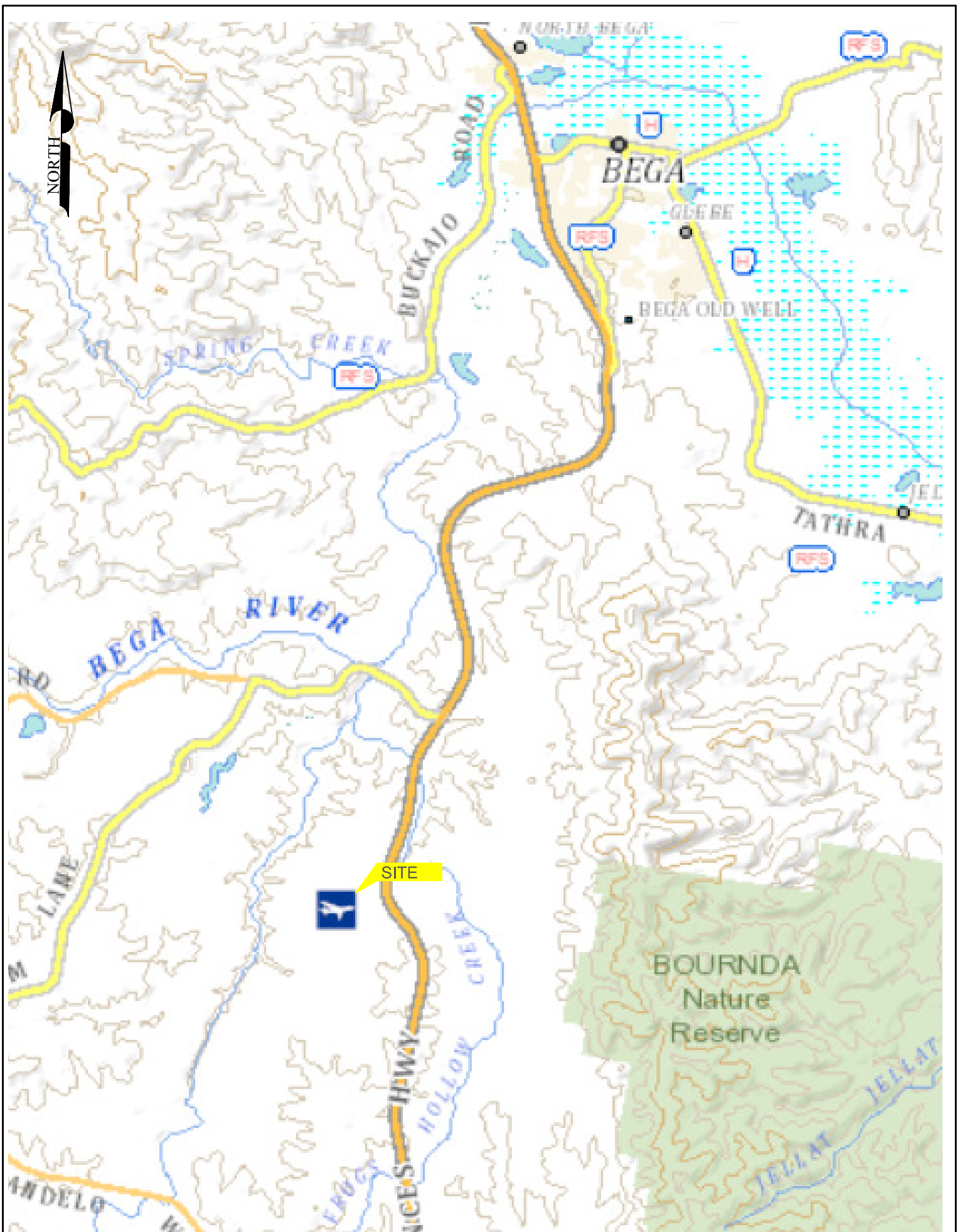
6.0 REPORT LIMITATIONS

This report is based on field observations and information provided in the development plan. The site has been evaluated using commonly accepted engineering practices and standards. To the best of our knowledge these findings represent conditions at the times and places stated. The report should be read in its entirety. Figures and other attachments should not be separated from the report. The findings of this report should not be used to infer conditions for any other time or location except as specifically addressed in the report. Questions regarding this report, its findings or applicability to conditions not specifically addressed in the report should be directed to TEC. This report is intended to be used by the Client and their assigns. No part of this report may be used by any other party for any purpose without the express written permission of the Client and TEC.

Tasman Engineering Consultants

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Appendix A- Figures



TASMAN ENGINEERING CONSULTANTS

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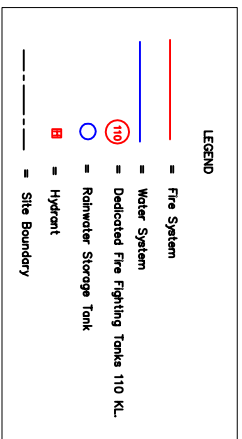
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Figure 1- Site Vicinity Map

On Site Sewage Management Assessment
Frogshollow Airstrip

DESIGN: _____
DRAWN: al _____
CHECKED: _____
SCALE: None _____
DATE: 25-9-17 _____



O.	Retention	Date	Date

Notes:

- 0 There shall be a dedicated water supply for fire fighting.
- 1) The dedicated supply shall be sourced from the rainwater collection system.
- 2) The dedicated supply shall be sourced from the rainwater collection system.
- 3) Each fire tank shall have a 65 mm Storz connection.
- 4) A back up supply shall be made available using a 65 mm Storz connection at each recycled water tank and at each irrigation pump station.

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Scale	1:2000		Title			
Drawn at	Date	25-10-17	Frogs Hollow Flight School Figure 2- Overall Site Plan			
Approved			Client			
			Recreational Aviation Australia			
A1			Size	Sheet		
A1			Drw No.	S-S-518		
A1			Drawn by		Rev	

Appendix E- References

References

1. National Water Quality Management Strategy, Australian Drinking Water Guidelines 6 2011, Australian Government National Health and Medical Research Council Natural Resource Management Ministerial Council, Version 3.3 , November 2016.
2. Guidance on Use of Rainwater Tanks. enHealth, Commonwealth of Australia 2010
3. National Water quality Management Strategy, Australian Guidelines for Water Recycling, Managing health and Environmental Risk. Natural Resource Management Ministerial Council, Environmental Protection, 2006.
4. Planning for bushfire protection, NSW rural fire service 2006
5. AS 2441-2005 Installation of fire hose reels. Standards Australia.
6. AS 2949-2008 Fixed fire protection installations – pump set systems
7. AS 2419-2005 Fire hydrant Installations.
8. National Construction Code, Building Code of Australia 2015.