

ROCKHAMPTON REGIONAL COUNCIL APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with **Development Permit No.: D/77-2020**

Dated: 8 January 2021

Bushfire Hazard Assessment and Management Plan

37B Nine Mile Road, Nine Mile Creek

Prepared for Malcolm Love

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I. Introduction

I.I Background

Green Tape Solutions was engaged by Malcolm Love to prepare a bushfire hazard assessment and management plan (BHAMP) for a proposed Material Change of Use Application (construction of a dwelling) located at 37B Nine Mile Rd, Nine Mile Creek (Lot 4 on MPH11276) (the 'site'). The dwelling will be a small single bedroom cottage intended for occasional use, primarily on weekends.

This plan is revised to address the matters raised in Rockhampton Regional Council information Request for Development Application d/77-2020 for a material change of use for a dwelling house situated at 37b Nine Mile Road, Mount Morgan.

I.2 Site Description

The proposed development is located on a single lot with an approximate area of 160,000 m^2 (16.2 ha) within the Rockhampton Regional Council (RRC) local government area. The site is zoned as Rural under the Rockhampton Region Planning Scheme (version 2.1).

The site is bounded by vegetated properties on all sides (**Figure 1**). Access to the site is provided via an unnamed gazetted local road that turns off from the Burnett Highway approximately five kilometres south of the township of Mount Morgan. This road traverses a distance of approximately 650 m west to the north-western corner of the site, from which point a bush track approximately 360 m in length accesses the dwelling site located within the central portion of the property (**Figure 2**).

There are currently no buildings on the site. A small dam is located approximately 150 m north-east of the proposed development site. The proposed location for the new dwelling is within an abandoned high voltage power transmission line easement with an approximate corridor width of 60 m. This easement dissects the property north south.

The easement is mapped as Category X, while vegetation on either side of is mapped as Category B (remnant) on the Regulated Vegetation Management (RVM) map under the *Vegetation Management Act 1999* (VM Act). An area within the cleared corridor 120 m south of the dwelling site is mapped as Category R (reef regrowth) watercourse vegetation. Vegetation surrounding the proposed dwelling has been previously cleared for the high voltage power transmission line and currently consists of predominantly native grasses. A detailed description of the vegetation communities on site and surrounding the site is provided in **Section 3.1**.



Figure 1: Site location (Source: Queensland Globe).

I.3 Scope of Work

The purpose of this BHAMP is to assess compliance of the proposed development with the outcomes sought by the Rockhampton Region Planning Scheme (Version 2.1), in particular the outcomes under the Bushfire hazard overlay code. It also provides a plan for bushfire risk management including building construction requirements, asset protection zones, fuel management, access requirements and emergency responses measures. Recommendations are consistent with legislative requirement and the requisite needs to reduce the risk to life and property in bushfire-prone environment.



2. Bushfire Regulatory Framework

Given that bushfire hazard can cause harm to people and social wellbeing, damage to property and impacts to the economy and environment, the management of bushfire hazard in Queensland is considered an integral component of land use planning and development decisions.

There are three regulatory mechanisms/instruments applicable to the site that regulate development to avoid and mitigate potential impacts associated with bushfire hazard:

- State Planning Policy (SPP) and associated guidelines (DILGP, July 2017);
- Rockhampton Regional Council (RRC) Planning Scheme 2015 (Ver 2.1) (Rockhampton Regional Council, 2015); and,
- Australian Standard AS 3959:2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2018).

2.1 State Planning Policy (SPP)

The SPP identifies the Queensland Government's policies about matters of state interest in land use planning and development (DILGP, July 2017). The SPP is a broad and comprehensive statutory planning instrument. It sits above regional plans, standard planning scheme provisions and local government planning schemes within the hierarchy of planning instruments outlined in the *Planning Act 2016*.

The SPP is supported by the following guidance material:

- The SPP state interest guidance material Natural hazards, risk and resilience Bushfire ('SPP guidance') (DSDMIP, 2019), which provides further context to the SPP and explains how the SPP policies can be applied, in particular for local government when making or amending local planning instruments. The SPP guidance is also intended to assist assessment managers and practitioners in applying the SPP assessment benchmarks when state interests have not been integrated into the local planning scheme (where applicable).
- The 'Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest - Natural Hazards, Risk and Resilience – Bushfire ('BRC technical document') (QFES, 2019a), which provides technical guidance and policy positions of the Queensland Fire and Emergency Services (QFES). It includes procedures for undertaking a bushfire hazard assessment (BHA), calculating asset protection zones and preparing a Bushfire Management Plan.

The SPP is also supported by a state-wide map of bushfire prone areas (BPA) (also referred to as bushfire hazard areas) that was developed based on the CSIRO modelling of potential fire-line intensity using the methodology described by Leonard *et al.* (2014). This mapping acts as a trigger for assessment against the SPP assessment benchmarks for the Natural Hazards, Risk and Resilience State Interest.

The SPP assessment benchmarks outlined in Part E of the SPP and Section 4.0 of the SPP guidance apply to development to the extent that the development is assessable against a planning scheme and only to the extent that the planning scheme is inconsistent with the SPP.



An excerpt from the SPP Assessment Benchmark – BPA mapping published on the SPP Interactive Mapping System (IMS) is provided in **Figure 4**. The proposed dwelling site is within the Potential Impact Buffer area. Vegetation mapped as Medium Potential Bushfire Intensity areas is located within 100 m of the proposed dwelling.



Figure 2: State Planning Policy Bushfire Mapping for the site (Source: DSDMIP SPP IMS)

2.2 Rockhampton Region Planning Scheme

The site is located within the Rockhampton Regional Council local government area and is subject to the provisions of the Rockhampton Region Planning Scheme (Ver 2.1).

The RRC Planning Scheme Bushfire hazard area overlay maps the proposed dwelling site within a Potential Impact Buffer area, with surrounding land mapped as Very High Potential Bushfire Intensity. This mapping acts as a trigger for assessment against the Bushfire hazard overlay code. An assessment against the code is provided in **Section 6**.





Figure 3: RRC Planning Scheme Bushfire Hazard overlay mapping

2.3 Australian Standard 3959:2018

The Australian Standard *AS3959:2018 Construction of Buildings in Bushfire-Prone Areas* (Standards Australia, 2009) specifies the requirements for the construction of buildings in bushfire-prone areas to improve their resistance to bushfire attack. AS3959:2018 applies to those areas where a regulated map (i.e. a planning scheme overlay map) identifies an area as a bushfire prone area (or similar), requiring calculation of Bushfire Attack Level (BAL) in accordance with a methodology outlined in the standard.

AS3959:2018 thus prescribes the construction details for buildings depending on the calculated BAL. The detailed requirements relating to construction methods and materials are typically dealt with as part of building design and enabled via private certification in accordance with the Building Code of Australia.



3. Bushfire Hazard Assessment

A site-specific BHA for the site has been undertaken in accordance with the methodology outlined in the 'Bushfire Resilient Communities' (BRC) technical document (QFES, 2019a). The methodology underpinning the BHA process consists of three stages:

- 1. An assessment to verify the reliability of existing BPA mapping over the site and land surrounding the site (the 'assessment area') and to streamline the detailed BHA process.
- 2. A hazard assessment involving field investigations to ground-truth the accuracy of the BPA mapping for the site, where required. The hazard assessment area must include the development area and all land within 150 metres of the development site.
- Using the results of the site-specific assessment, the asset protection zone width needed to achieve the requisite radiant heat levels is calculated using the SPP Bushfire asset protection zone (APZ) calculator or Method 2 of the Australian Standard, AS3959:2018.

Where the precision and/or accuracy of BPA mapping or map input datasets are insufficient (e.g. where there has been changes in land use and vegetation cover within the assessment area), the process enables applicants to create a local-scale BPA map based on the results of the site investigation and to apply modified input variables that reflect changes that have occurred over time. The BHA process adapts the method used to generate the state-wide BPA mapping, described in Leonard *et. al.* (2014).

A site assessment was undertaken by a senior ecologist from Green Tape Solutions on 23rd June 2020 to ground-truth the accuracy of the BPA mapping for the site and surrounding land.

3.1 Hazard Assessment

• Step 1: Identification of Fire weather severity

Identification of all Forest Fire Danger Index (FFDI) values applicable to the site (based on a 1:20 year (5%) Annual Exceedance Probability (AEP) fire weather event) using the Bushfire Hazard Area – Bushfire Prone Area – Inputs dataset from the Queensland Government data portal.

<u>Step 2:</u> Identification of Vegetation Hazard Classes

Assessment of vegetation communities to identify the relevant vegetation hazard classes (VHCs) using a combination of remnant and pre-clearing regional ecosystem maps, high-resolution aerial imagery and a ground-truthed assessment of vegetation present within the site and the required 150 m assessment area.

<u>Step 3</u>: Slope assessment

Identification of site slope and effective slope, and determination of whether proposed buildings are upslope or downslope of hazardous vegetation using Bushfire Hazard Area – Bushfire Prone Area – Inputs dataset from the Queensland Government data portal and 1 m contour data.

• <u>Step 4</u>: Remodelling of bushfire hazard and calculation of potential fireline intensity -Where a change to the distribution, extent and/or classification of VHCs within the assessment area is proposed, remodelling of bushfire hazard is undertaken to determine how the changes



to VHCs and associated fuel loads affect potential fireline intensity. Potential fireline intensity is to be calculated in accordance with the method outlined in Leonard *et. al.* (2014).

VHCs and associated potential fuel loads are in accordance with Leonard *et al.* (2017), as provided in the BRC technical document and SPP Bushfire APZ width calculator published by the Queensland Fire and Emergency Services (QFES).

Relevant spatial datasets published by the QFES were accessed via the Queensland Spatial Catalogue (QSpatial) and the Catalyst Fire Management System (QFES, 2020).

3.1.1 Step I – Fire weather severity

The relevant Forest Fire Danger Index (FFDI) for the site was derived from the Fire Weather Severity (Forest Fire Danger Index) raster provided as part of the Bushfire Hazard Area – Bushfire Prone Area – Inputs dataset.

The FFDI for the site and surrounding land is 68.

3.1.2 Step 2 - Vegetation Hazard Classes and Potential Fuel Loads

Different types of vegetation communities determine the rate at which dry fuel accumulates. Some vegetation communities protect fuel from drying out in all but extreme bushfire seasons and can then be susceptible to very destructive bushfires. Alternatively, vegetation communities may expose fuels to drying and therefore be frequently available for burning. Frequent bushfires can result in the development of bushfire-tolerant grassy woodlands or grasslands and less destructive bushfire behaviour.

3.1.2.1 Vegetation Hazard Classes

Mapped Vegetation Hazard Classes (VHCs) provided within the QFES Bushfire Prone Area inputs dataset for the development site and all surrounding land with the 150 m assessment area are provided in **Table 1**.

VHC	Description	Location in relation to dwelling
13.2	Dry to moist eucalypt woodlands on undulating metamorphics and granite	Surrounding the dwelling site to a distance of approximately 30 m east and west
40.4	Low grass or tree cover in rural areas	Approximately 30 m to the east and west of the dwelling site. North and south distance greater than 150 m.

Table 1: Vegetation Hazard Classes within 150 m of the proposed dwelling site.

Vegetation to the east and west of the dwelling site is mapped as Category B (remnant) (version 11.0) containing RE 11.12.1 - *Eucalyptus crebra* woodland on igneous rocks. This vegetation community was confirmed during the site assessment (**Plates 1 and 2**). This vegetation community conforms to VHC 13.2 – Dry to moist eucalypt woodlands on undulating metamorphics and granite.

The dwelling site is to be located within the cleared HV power transmission line in the central portion of the lot. This area is mapped as Category X (non-remnant). This vegetation conforms to VHC 40.4 – Low grass or tree cover in rural areas.



Figure 6 depicts the state-mapped VHCs for the development site. **Figure 7** depicts the ground-truthed extent of VHCs within the required 150 m assessment area.



Plate 1: Vegetation east of the proposed site



Plate 2: Vegetation west of the proposed site.



Plate 3: Vegetation north of the proposed site



Plate 4: Vegetation south of the proposed site







3.1.2.2 Potential Fuel Loads

Fuel loads have been allocated for each VHC which represent the long-unburnt condition that would be typically exhibited 10 years after fire. In accordance with the values provided in Figure 14 of the BRC technical document (QFES, 2019a), the potential fuel load datasets for ground-truthed VHCs within and surrounding the proposed development are provided in Table 2.

Table 2: Vegetation Hazard Class fuel loads for the site

	VHC	Total surface fuel load (t/ha)	Total overall fuel load (t/ha)
13.2	Dry to moist eucalypt woodlands on undulating metamorphics and granite	12.8	14.4
40.4	Low grass or tree cover in rural areas	4.5	5.0

3.1.3 Step 3 - Site and Effective Slope

Two slope input parameters are required for the estimation of fire behaviour and separation. Site slope is the slope of the ground between the edge of the proposed development (or site boundary) and the edge of hazardous vegetation. Effective slope refers to the slope of the land beneath hazardous vegetation. Effective slope is the more important parameter as it has a direct influence on the potential rate of fire spread, fuel consumption and thus, potential fire-line intensity. The effective slope is based on the slope of all land (in degrees) within the assessment area (including the slope beneath each VHC) and the relative position of land supporting hazardous vegetation in relation to the development sites i.e. upslope or downslope.

Site slope can be determined from the state-wide map of maximum landscape slope, local government data or based on the post-development site slope, for example after earthworks are completed. The site slopes downward from west to east and north to south. Vegetation to the west of the site is upslope from the proposed dwelling and vegetation east is downslope. The vegetation to the north and south of the proposed dwelling is classified as low hazard and no further consideration of VHC 40.4 is required. The effective slope beneath classified vegetation is -3 to the west and 3 degrees to the east.

3.1.4 Step 4 – Remodelling of bushfire hazard

The site-specific assessment determined that VHCs provided within the BPA – VHC – Central Queensland spatial dataset reflect the ground-truthed VHCs. Based on the results of the site-specific hazard assessment, potential fireline intensity has been recalculated to confirm the potential severity of bushfire hazard for the proposed development (i.e. potential bushfire hazard class).

Potential fireline intensity (PFI) is a standard measure of the rate at which an advancing fire would consume fuel energy per unit time per unit length of the fire front. This metric combines potential fuel load (PFL), maximum landscape slope (slope) and fire weather severity (FFDI) to provide a potential fireline intensity metric. PFI is to be calculated in accordance with the method described in Leonard et al. (2014). PFI is calculated using the following equation:

 $PFI = 0.62 PFL^2 x FFDI exp (0.069 x slope)$



Where: PFI = Potential fire line intensity (kW/m), PFL = Potential fuel load (tonnes / ha), FFDI = Potential severe fire weather (FFDI) and Slope = Max slope (degrees)

Table 3 shows the potential fireline intensity ranges (in kilowatts per metre) and the corresponding potential bushfire hazard classes.

The potential fireline intensity was calculated using the inputs from Steps 1 - 3 for classified vegetation within 150 m of the site following patch and corridor filtering. The results are presented in **Table 4**.

Table 3: Potential fireline intensity ranges and bushfire hazard classes

Potential Fireline Intensity (kW/m)	Potential Bushfire Hazard Class
40,000+ kW/m	Very high
20,000 – 40,000 kW/m	High
4,000–20,000 kW/m	Medium
0 – 4,000 kW/m	Low

Table 4: Potential fireline intensity	for classified VHCs within 1	150 m assessment area after filtering.
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VHC		Location in relation to development site	Total overall fuel load (t/ha)	Max landscape slope (degrees)	Fire weather severity (FFDI)	Potential fireline intensity (PFI)	Prone type	Potential bushfire hazard class
13.2	Dry to moist eucalypt woodlands on undulating metamorphics and granite (remnant status)	East	14.4	3 downslope	68	9,558 kW/m	1	Medium
13.2	Dry to moist eucalypt woodlands on undulating metamorphics and granite (remnant status)	West	14.4	-3 upslope	68	7,107 kW/m	1	Medium
40.4	Low grass to tree cover in rural areas	N, E, S, W	5.0	3	68	1,054 kW/m	2	Not BPA

These results show that eucalypt woodland surrounding the development site is classified as medium hazard. Grassland vegetation surrounding the proposed development site is classified as low hazard i.e. not bushfire prone. Given that the proposed development site is located within 100 m of bushfire-prone area, land encompassing the proposed development is located within the Potential Impact Buffer area.

Based on these results, the severity of bushfire hazard for vegetation on adjacent land is Medium, which is consistent with the state mapping.

3.2 Separation and Radiant Heat Exposure

The BRC technical document requires that radiant heat exposure be calculated using either the SPP Bushfire APZ calculator (QFES, 2019b), which is the preferred method or Method 2 of AS3959:2018. Where Method 2 is used, the site-specific values for FFDI (Step 1), the ground-truthed VHCs (Step 2)



and their associated fuel loads (provided in Figure 14 of the BRC technical document) and site and effective slopes (Step 3) are to be used.

The Method 2 Minimum Distance calculator published by the Fire Protection Association of Australia (FPAA) has been used to calculate the minimum distances required to achieve the range of radiant heat levels (represented by Bushfire Attack Levels or BALs), using the following inputs:

- Fire danger index of 68;
- Effective slope of three (3) degrees to the east and negative three (-3) to the west;
- Site slope of three (1) degrees from east to west; and
- Vegetation classification of Forest (VHC 13.2) with total surface fuel load of 12.8 t/ha and overall total fuel load of 14.4 t/ha.

The results of the radiant heat exposure calculations are provided in Section 4.



4. Bushfire Attack Level

Bushfire Attack Levels (BALs) are used to quantify the level of attack that built structures may experience during a fire event. The BAL is defined as 'a means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per metre squared, and the basis for establishing the requirements for construction to improve protection of building elements from attack by bushfire' (Standards Australia, 2018). BALs apply to buildings and any attached or adjacent structure within 6 m of the building.

AS3959:2018 adopts six BAL categories, which are based on the level of radiant heat flux to which buildings may be exposed to during a bushfire event. This level of heat flux generally relates to the type of vegetation, effective slope and how far a building is from hazardous vegetation.

The BAL for Medium hazard vegetation (Eucalypt woodland) to the east and west of the development site has been calculated in accordance with Method 2 of AS 3959:2018 using the site-specific inputs (including inputs from datasets published by the CSIRO and QFES) provided in Section 3.4. Minimum distances have been calculated using the Flamesol Method 2 – Minimum Distance calculator. The minimum separation distances for each BAL are provided in **Table 5** below. Minimum distance is to be measured as the distance from the building at its nearest point to the edge of hazardous vegetation.

Location	BAL-FZ (Flame Zone)	BAL-40	BAL-29	BAL-19	BAL-12.5	
Eucalypt woodland West	0 < 6.1 m	6.1 - < 8.3 m	8.3 - < 12.4 m	12.4 - <18.2 m	18.2 -< 100 m	
Eucalypt woodland West	0 < 8.1 m	8.1 - <11.3 m	11.3 - <16.7 m	16.7 - <24.3 m	24.3 -< 100 m	

Table 5: Determination of Bushfire Attack Level (BAL) minimum distances for hazardous vegetation.

The proposed development footprint is located 20 m from hazardous vegetation to the east and 22 m from hazardous vegetation to the west. Based on these separation distances, the BAL for the proposed development is BAL-19. However, implementation of an Asset Protection Zone (APZ) around the development in accordance with Section 5.5 of this report would provide for a cleared Inner Protection Area (IPA) of 10 m in width and an Outer Protection Area (OPA) of an additional 15 m in width (i.e. an overall width of 25 m between the dwelling and the edge of hazardous vegetation). Management of fuel within the APZ will be undertaken to ensure minimal fuel condition, thereby achieving an effective separation distance of 25 m between the development and hazardous vegetation and a **BAL of 12.5**.



5. Bushfire Management Plan

The SPP requires that where it is not possible to avoid a bushfire prone area, development mitigates the bushfire risk to people and property to an acceptable or tolerable level. This can be achieved through development design and siting, hazard reduction practices and emergency mitigation measures for any buildings bordering potentially bushfire-susceptible vegetation. These practices and measures include fuel reduction and management, road infrastructure to provide safe access and egress, appropriate building design and construction standards, procedures for fighting bushfires and fire intensity reduction management measures.

This section has been provided for information purposes and should be refined where necessary (e.g. including any requirements for Inner and Outer Protection Zones and the required widths of these zones) based on the final designs.

5.1 Agencies / Persons Responsible

The responsible fire authority is the Queensland Fire and Emergency Services (QFES), with the Rural Fire Brigade being responsible for bush fires and the Fire and Rescue Service being responsible for structural fires within urban areas. It is the responsibility of the proponent to ensure that the relevant measures required by this hazard report are in place prior to inspection by the Council and the building certifier, and to ensure that the measures are in place prior to enacting the approval. Furthermore, it is the responsibility of the proponent to ensure that the site.

5.2 Owner / Occupier Responsibilities

It is the responsibility of the owner of the proposed development to maintain the property in accordance with the conditions outlined in this report. The owner / occupier responsibilities include:

- Specified Asset Protection Zones (APZs) are to be maintained between buildings and retained vegetation. Details of the APZ are provided in Section 5.5.
- Low fuel loads are to be maintained surrounding the development by using low flammability or non-combustible species and mulches within any landscaped areas, undertaking regular vegetation management and maintenance where necessary and practicable (e.g. brushcutting, weed removal etc.) and removal of debris and rubbish;
- All access routes are to remain clear of obstacles to enable effective emergency vehicle access and egress; and
- No burning is to be undertaken on-site without a Permit to Burn as issued by the local Fire Warden (and approval if required, in writing, from Council).

5.3 Reporting and Auditing

This bushfire report is a controlled working document that is to be updated and revised to reflect adaptive management and constructive feedback. Some sections of the plan may be modified, new procedures may be implemented, and responsibilities altered, depending on feedback and application.

This bushfire report will only ever be modified with the agreement of QFES or Rockhampton Regional Council. This agreement allows for changes to the plan scope, as determined through consultation



and the acceptance of the proponent. That is, where further actions are deemed necessary or where actions can be reduced in scope.

5.4 Siting of Buildings

In accordance with the SPP 2019 and RRC Planning Scheme the proposed site design has considered the key principles when siting facilities. The relevant clauses that have been considered are:

- Utilising areas previously cleared to reduce ecological impacts;
- Maximise where practicable the building frontage setbacks from any hazardous vegetation and flammable materials (e.g. fences, mulches, shrubs and trees); and
- Site buildings so that elements of the development that are least susceptible to fire, are situated closest to the bushfire hazard (e.g. parking areas, roads).

5.5 Asset Protection Zones

The use of an Asset Protection Zone (APZ) is the most effective defence against flame and radiant heat and to a lesser extent, ember attack. An APZ of 25 m shall be established surrounding the proposed development. The APZ shall consist of two areas (Figure 6):

- Inner Protection Area (IPA) of 10 m width around buildings (measured from the edge of built elements) to provide defendable space and for managing heat intensities at the building surface. The IPA shall be maintained as cleared area that is free of all trees and flammable material. Landscaping treatments within the asset protection zone shall comprise only low threat vegetation, including grassland areas which are to managed through regular slashing or mowing to ensure minimal fuel condition (i.e. ≤ 100 mm nominal height as specified in AS3959:2018) at all times. Garden beds are not to be located any closer than 10 metres to any exposed window or door.
- 2. Outer Protection Area (OPA) of 15 m in width measured from the edge of the IPA. The OPZ shall be provided to reduce the potential length of flames by slowing the rate of spread, filtering embers and suppressing the crown fire. Native canopy trees may be retained within the OPA, however thinning may be required to provide a tree canopy cover of less than 30%. The understorey and ground stratum of the OPA must be managed (mowed/slashed) to treat all shrubs and grasses on an annual basis in advance of the fire season. The ground layer is to be regularly managed to achieve minimal fuel condition (i.e. ≤ 100 mm nominal height as specified in AS3959:2018).

The 25m APZ is contained within the existing cleared area. Maintenance of the understory layer within the Least Concern Vegetation community on the western side of the easement (at the track entrance) will be required to maintain the Outer Protection Zone for the site (Figure 6).

There will not be a need to clear vegetation to achieve the entire asset protection zones (APZ) for the dwelling.



5.6 Access Roads

Access to the proposed development shall be provided via an unnamed gazetted local road that turns off from the Burnett Highway. This road traverses approximately 650 m west to the north-western corner of the site, from which point a bush track approximately 295 m in length accesses the dwelling site located within the central portion of the property.

Access tracks track will be constructed to a width of 6 metres from the Burnett Highway to the proposed dwelling site in accordance with the RCC Acceptable Outcome 1.1. 2 Further, the access tracks will conform to the State Planning Policy, Natural hazards, risks and resilience Bushfire which states that the access tracks will provide:

A working area each side of the trafficable area

- a) with a minimum width of 3 metres each side'
- b) cleared of all flammable vegetation greater than 0.1 metre in height.'

Signage will be provided at the entrance to the access tracks to direct emergency services to the site which has the access point signed and direction of travel identified.

Plates 5, 6 and 7 show the unformed access road which has a gravel surface for most of the alignment. The steepest sections have a slope of approximately 12.5 percent. This section of the access road to the site has a minimum formed width of 4 m and overhead clearance of 4.8 m, with passing areas available along the road. The steeper sections of the track will be modified with minor earth works to ensure a consistent grade and manage potential erosion. This track will conform to QFS access standards.

The internal access track (**Plates 8, 9 and 10**) has some gravelled sections providing all weather access, however the lower section (final 100 m) which traverses a small watercourse that does not have any hardening. This section shall be maintained to provide all-weather access to the dwelling. The steeper sections of the track will be modified with minor earth works to ensure a consistent grade and manage potential erosion. This track will conform to QFS access standards.

The Standard for access is described in Table 8.2.4.3.1 Acceptable Outcome AO1.1.2 is "separated from hazardous vegetation by a public road or fire trail with a minimum width of four (4) metres and at least six (6) metres clear of vegetation, with a minimum of 4.8 metres vertical clearance and a maximum gradient of 12.5 per cent".

An additional 10 m wide access to the south is included in the design to avoid wet weather limiting the ability of fire-fighting vehicles accessing the site. It also allows for a circuit arrangement for vehicles travelling to and from the dwelling. As the access is 10m wide it allows for passing opportunities for fire fighting appliances.

Six passing bays with an eight (8) metres radius will be constructed at the following intervals from the property boundary to the dwelling site. The passing bays as shown on Figure 6, are situated within existing areas of low vegetation are approximately 60m metres apart. Some minor vegetation clearing may be necessary.



A further three passing bays with an eight (8) metres radius will be constructed at the following intervals from the vegetated boundary on the unformed road to the gate at the property boundary will be constructed at approximately 100m intervals. The passing bays as shown on Figure 6 are situated within existing areas of low vegetation. There will be no impact on the existing vegetation. Figure 6 shows the respective trafficable routes to the dwelling.





Plate 5: Entrance (east) from the Burnett Highway – Unnamed gazetted road. Gate is not locked.

Plate 6: Gazetted road leading to site.



Plate 7: Section of gazetted road providing access to the lot.



Plate 8: Internal access track within the lot – heading south.





Plate 9: Internal access track looking north.



Plate 10: Internal access track at entrance to cleared area.







5.7 Electricity Supply

The proposed development will have a standalone hybrid electricity supply of about 3.5 kVA consisting of solar, battery and petrol / diesel generator set. The generator will be rated to 3.5kVA. An adequate supply of fuel will be kept on site for the generator.

5.8 Water Supply

The proposed house will be supplied by tank water only. A separate water tank specifically for firefighting purposes shall be installed. In accordance with Table 8.2.3.4.3.3 Water Storage Requirements of the RRC Bushfire hazard overlay code, a fire water supply of 20,000 litres shall be provided, since the lot is greater than 1 ha in area.

Tanks for fire-fighting water supply shall be:

- constructed from non-flammable material, for example steel or concrete (NOT plastic or poly if located above ground);
- located within 10 m of buildings;
- located within 6 m of a hardstand area allowing access for a heavy rigid fire appliance;
- fitted with fire brigade tank fittings consisting of
 - a 50 mm ball valve and male camlock coupling and metal pipe fittings for aboveground tanks; or
 - an access hole having a minimum diameter of 200 mm to allow access for suction lines for underground tanks;
- identified by directional signage clearly provided at the street access point.

5.9 Climate Change and Fire Weather – Projections for 2050

Climate change can act in two ways to affect fire behaviour. First, it may exacerbate the fire-weather risk of any given day, leading to increased frequency or intensity of extreme and very extreme fire-weather days. Second, an increase in the accumulated fire risk over a year might represent a longer fire season and a reduction in the number of days suitable for prescribed burning.

It is recommended to review this document and associated bushfire procedures at the site over the coming decades in response to any potential increases of bushfire risk from climate change.

5.10 Emergency Response Procedures

An onsite fire management and evacuation strategy should be developed and available to implement in the event of an emergency. In the event of a pending fire emergency, assistance is to be obtained by contacting dialling 000.



6. Assessment against the Bushfire Hazard Overlay Code

The site is mapped with the Bushfire hazard overlay under the Rockhampton Region Planning Scheme (Ver 2.1), which triggers a response to the Bushfire hazard overlay code. An assessment against this Bushfire Hazard Overlay Code is provided in **Table 6**.

An assessment against the State Planning Policy Assessment Benchmarks also applies as a 'matter to have regard to' in accordance with the *Planning Regulation 2017*. The SPP also contains specific assessment benchmarks for the Natural hazards, risk and resilience state interest. This is provided in **Table 7**.

Green Tape

Table 6: Assessment against the Rockhampton Region Planning Scheme (version 2.1) - Bushfire hazard overlay code.

Access - Lable 8.2.4.3.1 Development outcomes for	assessable development and requirements for accepted dev	velopment
Performance Outcomes	Acceptable Outcomes	Compliance Assessment
PO1 Development ensures that the location, siting, and design of development and associated driveways and access routes:	A01.1 A01.1.1 Where the development is located in an urban area, the development:	Complies with AO1.1.2 Section 5.6 of the Bushfire Management Plan describes the access routes to the property.
 a) avoid potential for entrapment during a bushfire; b) facilitate safe and efficient emergency services to access and egress the site during a bushfire; and c) enables safe evacuation of the site during a bushfire for site occupants. 	 a) has direct access to a constructed, all-weather, public road capable of carrying emergency service vehicles; b) has a maximum single access driveway length of sixty (60) metres from the street to the development; and c) access driveways have a maximum gradient of 12.5 per cent OR AO1.1.2 Where the development is located in a non-urban area, the 	Access tracks track will be constructed to a width of 6 metres from the Burnett Highway to the proposed dwelling site. Further, the access tracks will conform to the State Planning Policy, Natural hazards, risks and resilience Bushfire which states that the access tracks will provide: <i>A working area each side of the trafficable area</i> <i>with a minimum width of 3 metres each side'</i> <i>b)</i> cleared of all flammable vegetation greater than
	 a) has direct access to a constructed, all-weather, public road capable of carrying emergency service vehicles; b) is separated from hazardous vegetation by a public road or fire trail with a minimum width of four (4) metres and at least six (6) metres clear of vegetation, with a minimum of 4.8 metres vertical clearance and a maximum gradient of 12.5 per cent; and c) has: a) a maximum single access driveway length of sixty (60) metres from the street to the development; or increase driveways that are greater than sixty (60) metres from the street to the <u>dwelling</u> provide a turning circle with a minimum radius of eight (8) metres every sixty (60) metres. 	Tracks will be maintained to provide all-weather access to the dwelling. The steeper sections of the tracks will be modified with minor earth works to ensure a consistent grade and manage potential erosion. This track will conform to QFS access standards and not exceed 12.5 slope. Six passing bays with an eight (8) metres radius will be constructed at the following intervals from the property boundary to the dwelling site. The passing bays as shown on Figure 6, are situated within existing areas of low vegetation are approximately 60m metres apart. Some minor vegetation clearing may be necessary.
		A further three passing bays with an eight (8) metres radius will be constructed at the following intervals from the vegetated boundary on the unformed road to the gate at the property boundary will be constructed at approximately

Green Tape	100m intervals. The passing bays as shown on Figure 6 are situated within existing areas of low vegetation. There will be no impact on the existing vegetation. Figure 6 shows the respective trafficable routes to the dwelling.	quirements for accepted development (part)	Compliance	Complies with AO2.1.1 A dedicated water supply for firefighting (fire resistant storage tanks) will be installed during construction of the dwelling. The water tank will be located within ten (10) metres of the dwelling and shall comply with the specifications outlined in AO2.1.2.
		velopment outcomes for assessable development and re	Acceptable Outcomes	 A02.1.2 Where a reticulated water supply is not available or the development is not within eighty (80) metres of a hydrant, a water tank is provided within ten (10) metres of a hydrant, a water tank is provided within ten (10) metres of a hydrant, a water tank is provided within ten (10) metres of the building or structure, and the water tank has: a) a take-off connection from the building to the tank which is at a level that provides on-site water storage of not less than the water requirement outlined in Table 8.2.4.3.3; b) a hardstand area allowing heavy rigid fire appliance access within six (6) metres of a tank; and c) fire brigade tank fittings consisting of: i. for above ground tanks, i. for above ground water pipe fittings that are metal; or ii. for underground tanks, an access hole of 200 millimetre diameter (minimum) to allow access for suction lines. Note—Plastic tanks are not recommended, however if they are fully submerged with above ground access points they are acceptable. Note—Where water tanks are not reliable during pools, creeks and modelions.
		Water for fire fighting purposes - Table 8.2.4.3.1 Dev	Performance Outcomes	PO2 Development provides adequate and accessible water supply for firefighting purposes which is safely located and freely accessible for firefighting.

Green Tape	t and requirements for accepted development (part)	Compliance	f Not applicable No manufacture or storage of hazardous materials for resale is proposed.	Storage of fuel (Class 4) for the small generator will be not more than 1000 litres as specified under the <i>Dangerous</i> Goods Safety Management Regulation 2001.	or accepted development (part)		Compliance	Complies with AO4.1 The bushfire hazard assessment (Section 3 of this renort)	determined that the level of bushfire hazard posed by vegetation surrounding the development is of Medium severity.	The proposed development is separated from hazardous vegetation by 20 – 25 metres to the east and west and east respectively.	An Asset Protection Zone (APZ) with an overall width of 25 m shall be established between the dwelling and the edge of hazardous vegetation to the east and west. Management of fuel within the nominated APZ will be undertaken in accordance with Section 5.5 of this plan to ensure that the
	4.3.1 Development outcomes for assessable developmen	Acceptable Outcomes	A03.1 Development does not involve the manufacture or storage o hazardous materials within a bushfire hazard area.	Editor's note—Refer to the Work Health and Safety Act 2011 and associated regulation, the Environmental Protection Act 1994 and the relevant building assessment provisions under the Building Act 1975 for requirements related to the manufacture and storage of hazardous substances.	utcomes for assessable development and requirements f	hazard areas	Acceptable Outcomes	A04.1 The development has a Bushfire Attack Level of less than 12.5.	Editor's note—The Bushfire Attack Level is calculated in accordance with the methodology described in the Australian Standard AS 3959 — Construction of buildings in bushfire prone areas.		
	Activities involving hazardous materials - Table 8.2.	Performance Outcomes	PO3 Public safety and the environment are not adversely affected by the impacts of bushfire on hazardous	materials.	Avoiding the hazard: Table 8.2.4.3.1 Development o	Development within the high and very high bushfire	Performance Outcomes	PO4 The development is compatible with the level of risk associated with the hushfire hazard			

Green Tape	area surrounding the development is maintained in minimal fuel condition, thereby achieving an effective separation distance of 25 m between the development and hazardous vegetation and a BAL of 12.5.	The 25m APZ is contained within the existing cleared area. Maintenance of the understory layer within the Least Concern Vegetation community on the western side of the easement (at the track entrance) will be required to maintain the Outer Protection Zone for the site (Figure 6).	There will not be a need to clear vegetation to achieve the entire asset protection zones (APZ) for the dwelling.		Compliance	Not applicable	The proposed development does not entail the	establishment of essential community infrastructure or community facilities							
				assessable development (part)	Acceptable Outcomes	AO5.1 The following uses are not located in high or very high	bushfire hazard areas:	a) childcare centre;	 b) detention raciity; c) educational establishment; 	 d) emergency services; e) hospital; 	 f) industrial use involving manufacture or storage of hazardous materials; α) multiple dwelling: 	 b) outstation; b) outstation; b) relocatable home park; c) residential care facility; k) refirement facility. 	 rooming accommodation; shopping centre; 	 n) short-term accommodation; o) telecommunications facility; 	 p) tourist park; q) tourist attraction;
				Land Use: Table 8.2.4.3.2 Development outcomes for	Performance Outcomes	PO5	facilities are highly vulnerable development are	located, designed and sited to:	a) protect the safety of people during a bushfire;	b) not increase the exposure of people to the risk from a bushfire event;	c) minimise the risk to vulnerable populations; and	 ensure essential community infrastructure can function effectively during and immediately after bushfire events. 			

		Green Tape
	r) transport depot; and s) utility installation.	
General: Table 8.2.4.3.2 Development outcomes for	assessable development (part)	
Performance Outcomes	Acceptable Outcomes	Compliance
Reconfiguring a lot		
PO6 Where reconfiguration is undertaken a separation distance from hazardous vegetation is provided.	A06.1 In urban areas lots are separated from hazardous vegetation by a distance:	Not Applicable The proposed development does not involve a
Editor's note—The preparation of a bushfire management plan in accordance with SC6.5 — Bushfire management planning scheme policy can	 a) that achieves a Bushfire Attack Level of twenty-nine (29) or less at all boundaries; and b) is contained wholly within the development site. 	reconfiguration of lot.
assist in demonstrating compliance with this performance outcome.	OR	
	AO6.2 In non-urban areas a <u>building envelope</u> of reasonable dimensions is provided on each lot which achieves a Bushfire Attack Level of twenty-nine (29) or less at all boundaries	
	Editor's note—Where a separation distance is proposed to be achieved by utilising existing cleared developed areas external to the <u>site</u> , certainty must be established (through tenure or other means) that the land will remain cleared of hazardous vegetation.	
	For staged developments, temporary separation distances, perimeter roads or fire trails may be absorbed as part of subsequent stages.	
PO7	A07.1	Not applicable
In urban areas development includes a constructed	In urban areas lot boundaries are separated from hazardous	
perimeter road between the lots and hazardous	vegetation by a public road writen: a) has a two lane sealed carriageway;	The proposed development is in a Zoned Rural area and
vegetation with reliculated water supply. The access is available for both fire fighting and maintenance works	b) contains a reticulated water supply;	noun an an area
	 c) is connected to other public roads at both ends and at intervals of no more than 500 metres; 	Access for firefighting is described in section 5.6 .

Green Tape		Complies with AO8.1 Section 5.6 of the Bushfire Management Plan describes the access routes to the property. Access tracks track will be constructed to a width of 6 metres from the Burnett Highway to the proposed dwelling site. Further, the access tracks will conform to the State Planning Policy, Natural hazards, risks and resilience Bushfire which states that the access tracks will provide: A working area each side of the trafficable area a) with a minimum width of 3 metres each side' b) cleared of all flammable vegetation greater than 0.1 metre in height.' Tracks will be maintained to provide all-weather access to the dwelling. The steeper sections of the tracks will be modified with minor earth works to ensure a consistent grade and manage potential erosion. This track will conform to QFS access standards and not exceed 12.5 slope. Six passing bays with an eight (8) metres radius will be constructed at the following intervals from the property boundary to the dwelling site. The passing bays as shown on Figure 6, are situated within existing areas of low vegetation are approximately 60m metres apart. Some minor vegetation clearing may be necessary.
	 d) accommodates geometry and turning radii in accordance with Queensland Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines; e) has a minimum of 4.8 metres vertical clearance above the road; f) is designed to ensure hydrants and water access points are not located within parking bay allocations; and incorporates roll-over kerbing. 	 A08.1 In non-urban areas the development includes a perimeter road or an all-weather fire access trail which: a) separates the development from the hazardous vegetation with a width of at least twenty (20) metres; b) with a minimum formed width of four (4) metres; c) a minimum of 4.8 metres vertical clearance above the road; d) has a turning circle with a minimum radius of eight (8) metres every sixty (60) metres; e) has a quadient no greater than 12.5 per cent and a cross fall of no greater than ten (10) degrees; f) has a gradient no greater than the (10) degrees; h) has the access point signed and direction of travel identified; and i) has a suitable arrangement in place to ensure maintenance in perpetuity.
		PO8 In non-urban areas development includes a perimeter road or an all-weather fire access trail which is available for both fire fighting and maintenance/hazard reduction works.

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		A further three passing bays with an eight (8) metres radius will be constructed at the following intervals from the vegetated boundary on the unformed road to the gate at the property boundary will be constructed at approximately 100m intervals. The passing bays as shown on Figure 6 are situated within existing areas of low vegetation. There will be no impact on the existing vegetation. Figure 6 shows the respective trafficable routes to the dwelling.
PO9 Road widths and construction within the development are adequate for fire emergency vehicles.	No acceptable outcome is nominated.	Complies with PO9 Road widths will be maintained to at least 6m and meet the QFS standards of having A working area each side of the trafficable area a) with a minimum width of 3 metres each side b) cleared of all flammable vegetation greater than 0.1 metre in height.'
Emergency services access: Table 8.2.4.3.2 Develop	oment outcomes for assessable development (part)	
Reconfiguring a lot		
Performance Outcomes	Acceptable Outcomes	Compliance
PO10 Development facilitates the safe and efficient access and egress of emergency services during a bushfire event.	 A010.1 The development includes a perimeter road or a fire access trail which: a) separates the development from the hazardous vegetation; b) is a minimum of ten (10) metres in width, with a minimum formed width of four (4) metres; c) is a minimum of six (6) metres clear of standing flammable vegetation; d) has passing bays twenty (20) metres long by three (3) metres extra trail width, or turning facilities every 200 metres; e) has adequate drainage and erosion control devices; 	Complies with AO10.1. Section 5.6 of the Bushfire Management Plan describes the access routes to the property. Access tracks track will be constructed to a width of 6 metres from the Burnett Highway to the proposed dwelling site. Further, the access tracks will conform to the State Planning Policy, Natural hazards, risks and resilience Bushfire which states that the access tracks will provide: A working area each side of the trafficable area a) with a minimum width of 3 metres each side' b) cleared of all flammable vegetation greater than

Green Tape	0.1 metre in height.' Tracks will be maintained to provide all-weather access to the dwelling. The steeper sections of the tracks will be modified with minor earth works to ensure a consistent grade and manage potential erosion. This track will conform to QFS access standards and not exceed 12.5 slope.	Six passing bays with an eight (8) metres radius will be constructed at the following intervals from the property boundary to the dwelling site. The passing bays as shown on Figure 6, are situated within existing areas of low vegetation are approximately 60m metres apart. Some minor vegetation clearing may be necessary.	A further three passing bays with an eight (8) metres radius will be constructed at the following intervals from the vegetated boundary on the unformed road to the gate at the property boundary will be constructed at approximately 100m intervals. The passing bays as shown on Figure 6 are situated within existing areas of low vegetation. There will be no impact on the existing vegetation. Figure 6 shows the respective trafficable routes to the dwelling.	Signage will be provided at the entrance to the access tracks to direct emergency services to the site which has the access point signed and direction of travel identified.	A suitable maintenance program will be implemented to ensure ongoing suitability of the access tracks to the site for emergency services.	
	 has a gradient no greater than 12.5 per cent and a cross fall of no greater than ten (10) degrees; has access at each end of the perimeter road or the fire trail from a public road; has the access point signed and direction of travel identified; and has suitable arrangements in place to ensure maintenance in perpetuity. 					

		Green Tape
Avoiding the hazard: Table 8.2.4.3.2 Development o	utcomes for assessable development (part)	
Reconfiguring a lot		
Performance Outcomes	Acceptable Outcomes	Compliance
P011	A011.1	Not applicable
Road widths and construction within the development are adequate for fire emergency vehicles to gain	Road access minimum clearances of 3.5 metres wide and 4.8 metres high are provided for safe passage of emergency vehicles.	The proposed development is not in an urban area.
access to a safe working area close to dwellings and	Editor's note—For further information on how to address the above	
near water supplies whether or not on-street parking	criteria please see Queensland Fire and Emergency Service: Fire hydrant and vehicle access guidelines for residential. commercial	
spaces are occupied.	and industrial lots.	
P012	A012.1	Not applicable
Hydrants are suitably identified so that fire services	Hydrants are identified as specified in <u>Queensland Fire and</u>	-
can locate them at all hours	Emergency Service: Fire hydrant and vehicle access	The nronosed development is not in an urhan area
	guidelines for residential, commercial and industrial lots.	However a standalone fire water supply (20,000 litres) will
	Editor's note—Fire hydrants are designed and installed in	be made available for fire fighting purposes.
	accordance with Australian Standard 2419.1 Fire hydrant	
	installations – system design, installation and commissioning, unless	
	specified by the relevant water entity.	
	•	

State Planning Policy 2017 (SPP 2017) Assessment Benchmarks

For the purposes of development assessment, the SPP applies as a 'matter to have regard to' in accordance with the Planning Regulation 2017. The SPP also contains specific assessment benchmarks for the Natural hazards, risk and resilience state interest.

Table 7: Compliance with the SPP Planning Policy Assessment Benchmarks

Compliance Assessment	Not applicable	This assessment benchmark is not applicable to bushfire hazard considerations.	Not applicable	This assessment benchmark is not applicable to bushfire hazard considerations.
Assessment Benchmarks for the Natural hazards, risk and resilience state interest	1 Erosion prone areas within a coastal	management district	2 Erosion prone areas within a coastal	

		Green Ia
Assessm resilience	ent Benchmarks for the Natural hazards, risk and e state interest	Compliance Assessment
с	Bushfire, flood, landslide, storm tide	Applicable
	inunuation, and erosion prone areas outside the coastal management district	This bushfire management plan (BMP) provides a site-specific bushfire hazard
	Development other than that assessed against (1) above, avoids natural hazard areas, or where it is	assessment that continue the rever or pushing nazar to the development site. assessment confirmed that the development is adjacent to a bushfire prone area i.e. vegetation that presents a medium severity of bushfire hazard.
	not possible to avoid the natural hazard area, development mitigates the risks to people and property to an acceptable or tolerable level.	The development is not able to completely avoid bushfire prone area, however the mitigation measures outlined in this BMP are sufficient to reduce the risk to a tolerable level. These measures include providing a minimum setback/separation distance between development and bushfire prone vegetation to achieve a bushfire attack level (AAL) of 12.5, establishment and ongoing management of an Asset Protection Zone (APZ) around the development and construction of the new dwelling in accordance with the
4	All natural hazard areas:	
	Development supports, and does not hinder, disaster management response or recovery capacity or capabilities.	The development will be constructed with a dedicated water supply solely for firefighting use of 20, 000 L capacity. This water supply will comply with all stipulations outlined in the Rockhampton Region Planning Scheme (version 2.1).
	Example of how a development may demonstrate compliance: Assessable Development: To ensure emergency services can respond effectively, development is located within a reticulated water supply area or includes a dedicated static water supply that is available solely for fire-fighting purposes and can be accessed by fire-fighting vehicles.	In addition, the specified APZ shall provide defendable space and working area for fire- fighting and manoeuvring of fire-fighting appliances.
5	All natural hazard areas:	Applicable
	Development directly, indirectly and cumulatively avoids an increase in the severity of the natural	The development will not increase the severity or potential to damage to other property. No vegetation rehabilitation is planned for the site.
		-

Assessm resilience	ent Benchmarks for the Natural hazards, risk and state interest	Compliance Assessment
	hazard and the potential for damage on the site or to other properties.	
9	All natural hazard areas:	Not applicable
	Risks to public safety and the environment from	The development is for a new dwelling on the site.
	rife rocation of these materials as a result of a natural hazard are avoided.	No manufacture or storage of hazardous materials for resale is proposed.
		Storage of fuel (Class 4) for the small generator will be not more than 1000 litres as specified under the Dangerous Goods Safety Management Regulation 2001.
7	All natural hazard areas:	Applicable.
	The natural processes and the protective function of landforms and vegetation that can mitigate risks associated with the natural hazard are maintained or enhanced.	The development shall be sited within an asset protection zone (APZ) with a total width of 25m, consisting of an inner protection area (IPA) of 10 m in width and an outer protection area (OPA) of an additional 15 m in width.
	 Where a requirement for an asset protection zone (or similar) exists 	The APZ will be managed in accordance with the requirements outlined in Section 5 of this BMP. These management measures include landscape treatments and management to ensure low-combustibility and low fuel loads.
	Landscaping treatments comprise only low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks. OR Landscaping management maintains a potential available fuel load which is less	

		Green Tape
Assessment Benchma resilience state interes	arks for the Natural hazards, risk and st	Compliance Assessment
tha	an eight tonnes/hectare in aggregate, d fuel structure which is discontinuous.	
L SO	ite – The preparation of a landscape unagement blan undertaken in	
acc	cordance with the methodology in the ES Bushfire resilient communities	
do cor	cument may assist in demonstrating mpliance with this assessment	
OR		
De ma incl veç	welopment includes a bushfire anagement plan for the maintenance of y identified asset protection zone, auding landscape design and ongoing getation management.	



7. Conclusion

This BMP has been prepared to provide a site-specific bushfire hazard assessment to assess the bushfire risk for a Material Change of Use application for 37B Nine Mile Rd, Nine Mile Creek (Lot 4 on MPH11276), and the construction of a new dwelling on site. This assessment determined that eucalypt woodland adjacent to the development site is classified as medium hazard and the proposed development site is located within the Potential Impact Buffer area (i.e. within 100 m of bushfire-prone area).

An Asset Protection Zone (APZ) with an overall width of 25 m shall be established between the dwelling and the edge of hazardous vegetation to the east and west. Management of fuel within the nominated APZ will be undertaken in accordance with Section 5.5 of this plan to ensure that the area surrounding the development is maintained in minimal fuel condition, thereby achieving an effective separation distance of 25 m between the development and hazardous vegetation and a BAL of 12.5, which complies with the acceptable outcomes of the Rockhampton Region Planning Scheme Bushfire hazard overlay code.

Application of the recommendations outlined in this BMP will ensure compliance with the requirements of the Planning Scheme Bushfire hazard overlay code and the assessment benchmarks outlined in the State Planning Policy 2017 - Natural hazards, risk and resilience (Bushfire) state interest.



8. References

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Appendix 1: Method 2 calculations.



Calculated Nove mber 19, 2020, 5:56 pm (MDc v.4.8)

37B Nine Mile Road Mt Morgan	

	M	inimum Distance Calculator - A	53959-2018 (Method 2)		
Inputs	s	Outputs			
Fire Danger Index	68	Rate of spread	0.84 km/h		
Vegetation classification	Woodland	Flame length	7.24 m		
Surface fuel load	12.8 t/ha	Flame angle	53 °, 63 °, 72 °, 77 °, 79 ° & 84 °		
Overall fuel load	14.4 t/ha	Elevation of receiver	3 m, 3.37 m, 3.66 m, 3.85 m, 3.94 m & 4.68 m		
Vegetation height	n/a	Fire intensity	6,317 kW/m		
Effective slope	-3 °	Transmissivity	0.887, 0.876, 0.858, 0.838, 0.826 & 0.753		
Site slope	-1 °	Viewfactor	0.58919999999999999, 0.4338, 0.2899, 0.1955, 0.1583 & 0.0435		
Flame width	100 m	Minimum distance to < 40 kW/m²	6.1 m		
Windspeed	n/a	Minimum distance to < 29 kW/m²	8.3000000000001 m		
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	12.4 m		
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	18.2 m		
		Minimum distance to < 10	22.3 m		

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980 Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005 Flame angle - Douglas & Tan, 2005 Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005



Calculated June 29, 2020, 1:25 pm (MDc v.4.8)

37B Nine Mile Road

	Mi	nimum Distance Calculator - AS395	9-2018 (Method 2)
Inputs		Outputs	
Fire Danger Index	68	Rate of spread	1.28 km/h
Vegetation classification	Woodland	Flame length	10.07 m
Surface fuel load	12.8 t/ha	Flame angle	56 °, 66 °, 75 °, 80 °, 82 ° & 87 °
Overall fuel load	14.4 t/ha	Elevation of receiver	3.74 m, 4.01 m, 3.99 m, 3.69 m, 3.46 m & 1.07 m
Vegetation height	n/a	Fire intensity	9,558 kW/m
Effective slope	3 °	Transmissivity	0.881, 0.867, 0.845, 0.821, 0.808000000000001 & 0.74
Site slope	3 °	Viewfactor	0.5919, 0.4397, 0.2941, 0.1991, 0.1621 & 0.0443
Flame width	100 m	Minimum distance to < 40 kW/m²	8.199999999999999 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	11.1 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	16.6 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	24.2 m
		Minimum distance to < 10 kW/m²	29.1 m

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005





These plans are approved subject to the current conditions of approval associated with **Development Permit No.: D/77-2020 Dated: 8 January 2021**

CQ SOIL TESTING

AS1547 Wastewater Design

SITE ADDRESS:

Prepared for:

Job Number:

Issue Date:

Lot 4 (MPH11276) 37B Nine Mile Road, Nine Mile Creek

M Love

CQ17185

16/06/2020

SUMMARY OF RECOMMENDATIONS

<u>Treatment</u>

All-Waste Septic Tank (3000 litre minimum) With serviceable filter incorporated

Disposal Mechanism

One (1) Evapotranspiration/Absorption Bed 2.5 metres x 8.0 metres – Total Area 20 sqm

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Client & Document Information

Client:	M Love
Project:	Lot 4 (MPH11276)
	37B Nine Mile Road, Nine Mile Creek

Investigation Type:	Wastewater Investigation
Job Number:	CQ17185
Date of Issue:	16/06/2020

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Document Control

Version	Date	Author	Design	Reviewer	Reviewer
			Drawings		Initials
А	16/06/2020	F Phelan	F Phelan	Scott Walton	SWW



1. INTRODUCTION

The purpose of this report is to evaluate and define a suitable on-site sewerage treatment and disposal system for household effluents in accordance with Australian Standard 1547 "On-site domestic-wastewater management". The Queensland Plumbing and Wastewater Code has been used for reference purposes during the compiling of this report.

The field investigation was carried out on the 8th June 2020. This report relates exclusively to the proposed dwelling at the site identified on Page 1 of this report. This document has been prepared for the express purpose stated above. This document does not cover any other elements related to construction on the site.

2. SITE DESCRIPTION AND SUPPLIED INFORMATION

2.1 Allotment and Effluent Disposal Site

- The landholder was interviewed.
- All information included in this report relating to the dwelling size, water source, fixtures etc have been provided by the landholder or the landholders representative. The landholder is to liaise with neighbouring properties regarding the presence of discrete/unregistered bores that may exist/be proposed on adjacent allotments prior to system installation.
- The site is a rural type allotment located on Nine Mile Road (an unsealed road).
- The slope configuration in relation to surface drainage is linear planar.
- The proposed effluent disposal area falls to the south and is considered to have fair drainage.
- The soil surface condition was moist at the time of testing.
- There was no evidence of cracking of the surface during the investigation.
- There were no visible boulders on the surface of the allotment.
- There were no rock outcrops evident.
- There was no watercourse, bore, well, or dam evident within 50 m of the proposed disposal area at the time of this investigation.
- The proposed effluent disposal area is exposed to sun and wind.
- The proposed disposal site is an existing non grassed area.
- Surface water will drain toward the south.
- Surface water drainage from adjoining allotments may traverse this site.
- The weather conditions prior to testing were periods of moist conditions.
- The site is not a known flood area

2.1 Dwelling and Fixtures

- The dwelling type is single storey 1 bedrooms (2 equivalent persons – AS 1547:2012 Appendix J)
- The water source is tank water only.
 (120 litre/person/day AS 1547:2012 Appendix H)
- Standard water reducing fixtures are to be used throughout the dwelling
- A spa bath *is not* proposed to be installed
- A food waste disposal unit *is not* proposed to be installed

3. SOIL PROFILE

The borelogs carried out at the site (refer attached Site Plan for localities) indicate that the soil profile typically consists of clay soil. See Appendix 3 for detailed logs.



Groundwater was not encountered during the field investigation. Weathered rock was not encountered during the field investigation.

Soil Category BH1	Soil Texture	Structure	Indicative Permeability	Indicative Drainage Class
4	Clay	Weakly		Imperfectly
(00-100mm)	Loam	Structured	0.12 - 0.5 m/day	Drained
5	Light	Strongly		Poorly
(100-1500mm)	Clay	Structured	0.12 - 0.5 m/day	Drained

Table 1 - Determination of Soil Category

Table 2 – <u>Permeability test results and conclusions</u>

Test No.	Soil Permeability	Test hole depth	Recommended Design Loading Rate
PT 1	0.12	500 mm	
Average	0.12		8 (mm/day)

Permeability testing aids in the design of an "On-site domestic–wastewater management system". CQ Soil Testing carries out a permeability testing in accordance with Appendix 4.1F of the Australian Standard 1547.

Whilst every effort has been made to ensure that the borelogs carried out at the subject allotment are indicative of the soil profile over the site any discrepancy between the profile detailed in the borelogs and that observed during construction shall be referred to CQ Soil Testing for immediate attention.

4. INVESTIGATION DETAILS

The investigation carried out at the site included machine augured boreholes up to 1500 mm depth and a series of permeability test pits (see Appendix 4). These test pits are located in the proposed effluent disposal area as shown on the attached site report.

The Queensland Plumbing and Wastewater Code and AS 1547 suggests that the use of a primary-treated effluent disposal system will be satisfactory provided;

- Sufficient permeable surface soil overlying rock is present over the disposal area, not less than 1.2 metres depth.
- A suitable soil category material (as per AS 1547) and minimum required depth is encountered.
- A minimum set-back distance of 50m is obtained.
- Acceptable permeability rates are obtained.

All the above requirements have been met, therefore it is concluded that the use of a primary-treated effluent septic system is acceptable.

5. FINDINGS AND RECOMMENDATIONS

- All work must be carried out by a licensed plumber or drainer.
- All pipework shall be installed in accordance with AS3500.2.2, National Plumbing and Drainage, Part 2.2, Sanitary Plumbing and Drainage.
- The Design Loading Rate of 8 mm/day has been adopted.



5.1. Treatment

- Septic Tank 3000 Litre minimum to be installed.
- The local authority may require the installation of a grease trap.
- The septic tank shall be de-sludged and pumped out at a maximum interval of 5 years.
- A Septic Tank Filter shall be installed between the septic tank and the disposal area. Regular maintenance of the filter shall be undertaken, normally 3 monthly.

5.2. Disposal

- For the purpose of calculating evaporation, the long term average monthly pan evaporation and rainfall figures from the Bureau of Meteorology weather station at Rockhampton have been adopted. Water Balance and design calculations are appended.
- All wastewater shall be disposed of by Evapotranspiration/Absorption.
- The land application facility shall be by evapotranspiration-absorption with a total minimum area of **20 sqm**.
- A diversion mound shall be constructed above/around the disposal area to divert overland water flows.
- Effluent shall be distributed evenly throughout the beds via the use of a distribution chamber or equivalent system.
- The bed shall be 2.5 m in width and 8.0 m in length. One (1) is required.
- The bed shall be installed level and across the natural contour of the land.
- The finished surface shall shed water.
- See detailed drawings in Appendix 5.
- The disposal area has been calculated on a daily all-waste flow rate of 240 litres/day, (1 bedroom/2 people each using 240 litres per day) and a design load rate of 8 mm/day. This flow rate will accommodate all-waste flows from the proposed one bedroom residence using Standard Water-Reducing Devices, which include using a dual flush 6/3 litre water closet (maximum), shower flow restrictors, aerated faucets and a water conserving washing machine.
- The disposal area should be located in the vicinity of BH1, BH2 & BH3 and as per attached site plan.
- All set-back distances as required by the local authority shall be met.
- Stormwater run-off including roofwater from buildings shall be diverted around and away from the disposal area. Imported fill may be required should there be insufficient soil available for the design of the disposal system.

5.3. Vegetation and signage

- Water tolerant vegetation shall be planted to maximize evapotranspiration and shall be carefully chosen. See vegetation specified in AS 1547:2012 "Disposal Systems for Effluent from Domestic Premises (Appendix C)". CQ Soil Testing recommends consultation with local nurseries for selection/density of plantings.
- At least two signs stating "Recycled water Do Not Drink" are to be erected on boundaries.
- The presence of buried pipes shall:
 - (a) Be indicated e.g. using underground marking tape to AS/NZS 2648.1; OR
 - (b) Be indicated by signage. Signs shall be prominently displayed with the words:

"Sewage effluent pipework installed below. DO NOT DIG."



5.4. Greywater

Surface irrigation of greywater directly (without treatment) from the dwelling's washing machine is permissible. CQ Soil Testing recommends the surface irrigation of greywater. The washing machine shall be connected to a flexible hose with the hose distributing greywater to the landholder's garden/lawn. Provide an air admittance valve and suspend drainage (per AS/NZS 3500) to a rigid, fixed position external to building and reduce to a flexible hose fitting (minimum diam. 32 mm). Greywater should be used with care and used responsibly - Avoid:

- Ponding
- Run-off to neighbouring properties
- Causing an odour

When using greywater:

- Choose laundry detergents with low phosphorus, sodium and nitrogen content
- Take care not to keep watering the same spot it can affect soil and can cause plants to die
- Be careful when using on native plants and don't use on edible parts of vegetables or fruits
- Make sure it doesn't enter swimming pools or flow into neighbouring properties
- Avoid ponding, bad smells or damage to plants by restricting use or moving the outlet
- Keep away from children's play areas and the footings of buildings.

6. CERTIFICATION

The landholder shall read and understand all aspects of this design. CQ Soil Testing may carry out amendments to this design if requested **(additional fees apply)**.

The local authority may request that an inspection and certification is to be undertaken on the installation of the system when nearing completion. CQ Testing is qualified to undertake this task, and issue the appropriate Form 8 (additional fees apply). If certification is required the installer must:

- Contact CQ Soil Testing prior to "burying" the system to arrange an inspection
- Must photograph the entire installation process and supply to CQ Soil Testing
- Supply to CQ Soil Testing a Form 8 signed by the licensed installer

Yours faithfully

SCOTT WALTON Laboratory Manager



APPENDIX 1 - FIELD LOGS

BOREHOLE 1				
Depth (m)	Visual Class'n Symbol		Visual Description of Material	
0.0	SC	Clayey SAND, fine to	coarse grained, low plasticity fines, brown, D, D.	
0.1		CAT 4 Clay Loam – v	veakly structured	
0.1	СН	Sandy CLAY, high pla w/depth, D, H.	asticity, fine to coarse grained, dark brown- brown	
1.5		CAT 5 Light Clay –st	rongly structured	
		Borehole t	erminated at 1.5 m	
MOISTURE CONDITION	CONSISTEM	ICY RELATIVE DENSITY	Allowable Bearing Pressure calculated using the guidelines in "Determination of Allowable Bearing Pressure under Small	
MOISTURE CONDITION D – Dry	CONSISTEM VS – Very	NCY RELATIVE DENSITY Soft VL – Very Loose	Allowable Bearing Pressure calculated using the guidelines in "Determination of Allowable Bearing Pressure under Small Structures" by MI Stockwell (NZ Engineering June 1997)	
MOISTURE CONDITION D – Dry M – Moist	CONSISTEN VS – Very S – Soft	ICY RELATIVE DENSITY Soft VL – Very Loose L – Loose	Allowable Bearing Pressure calculated using the guidelines in "Determination of Allowable Bearing Pressure under Small Structures" by MI Stockwell (NZ Engineering June 1997) DCP test results are to be used as a guide only to relative density and	
MOISTURE CONDITION D – Dry M – Moist W – Wet	CONSISTENVS – VeryS – SoftF – Firm	ICY RELATIVE DENSITY Soft VL – Very Loose L – Loose MD – Med Dense	Allowable Bearing Pressure calculated using the guidelines in "Determination of Allowable Bearing Pressure under Small Structures" by MI Stockwell (NZ Engineering June 1997) DCP test results are to be used as a guide only to relative density and consistency of soils. Changes in moisture contents or the presence of roarse grained material can greatly influence the outcome of this	
MOISTURE CONDITION D – Dry M – Moist W – Wet	CONSISTEMVS – VeryS – SoftF – FirmST – Stiff	NCY RELATIVE DENSITY 'Soft VL – Very Loose L – Loose MD – Med Dense D – Dense D – Dense	Allowable Bearing Pressure calculated using the guidelines in "Determination of Allowable Bearing Pressure under Small Structures" by MI Stockwell (NZ Engineering June 1997) DCP test results are to be used as a guide only to relative density and consistency of soils. Changes in moisture contents or the presence of coarse grained material can greatly influence the outcome of this test.	
MOISTURE CONDITION D – Dry M – Moist W – Wet	CONSISTERVS – VeryS – SoftF – FirmST – StiffV/ST – Very	NCY RELATIVE DENSITY 'Soft VL – Very Loose L – Loose MD – Med Dense D – Dense D – Dense try Stiff VD – Very	Allowable Bearing Pressure calculated using the guidelines in "Determination of Allowable Bearing Pressure under Small Structures" by MI Stockwell (NZ Engineering June 1997) DCP test results are to be used as a guide only to relative density and consistency of soils. Changes in moisture contents or the presence of coarse grained material can greatly influence the outcome of this test.	



BOREHOLE 2				
Depth (m)	Visual Class'n Symbol		Visual Description of Material	
0.0	SC	<u>Clayey SAND</u> , fine to	coarse grained, low plasticity fines, brown, D, D.	
0.1		CAT 4 Clay Loam – w	veakly structured	
0.1	СН	Sandy CLAY, high pla w/depth, D, H.	sticity, fine to coarse grained, dark brown- brown	
1.5		CAT 5 Light Clay –str	rongly structured	
Borehole terminated at 1.5 m				
MOISTURE	CONSISTE	NCY RELATIVE DENSITY	Allowable Bearing Pressure calculated using the guidelines in "Determination of Allowable Bearing Pressure under Small	
D – Dry M – Moist W – Wet	VS – Very S – Soft F – Firm ST – Stiff V/ST – Ve H – Hard	/ Soft VL – Very Loose L – Loose MD – Med Dense D – Dense ery Stiff VD – Very Dense	Structures" by MI Stockwell (NZ Engineering June 1997) DCP test results are to be used as a guide only to relative density and consistency of soils. Changes in moisture contents or the presence of coarse grained material can greatly influence the outcome of this test.	



BOREHOLE 3				
Depth (m)	Visual Class'n Symbol		Visual Description of Material	
0.0	SC	Clayey SAND, fine to	coarse grained, low plasticity fines, brown, D, D.	
0.1		CAT 4 Clay Loam – w	veakly structured	
0.1	СН	Sandy CLAY, high pla w/depth, D, H.	sticity, fine to coarse grained, dark brown- brown	
1.5		CAT 5 Light Clay –str	rongly structured	
Borehole terminated at 1.5 m				
MOISTURE	CONSISTER	NCY RELATIVE DENSITY	Allowable Bearing Pressure calculated using the guidelines in "Determination of Allowable Bearing Pressure under Small Structures" by MI Stockwell (NZ Engineering June 1997)	
D – Dry M – Moist	VS – Very S – Soft	/ Soft VL – Very Loose L – Loose	DCP test results are to be used as a guide only to relative density and	
W-Wet	F – Firm	MD – Med Dense	consistency of soils. Changes in moisture contents or the presence of coarse grained material can greatly influence the outcome of this	
	ST – Stiff	D – Dense	test.	
	V/S1 – Ve	Dense	-	



APPENDIX 2 – DESIGNS & PHOTOGRAPHS





Image 2 Proposed disposal area



APPENDIX 3 - NOTES

- 1. Recommendations given in this report are based on the information supplied by the client regarding the proposed building construction in conjunction with the findings of the investigation. Any change in construction type, building location or omission in the client supplied information, may require additional testing and/or make the recommendations invalid.
- 2. Every reasonable effort has been made to locate the test sites so that the borehole profiles are representative of the soil conditions within the area investigated. The client should be made aware however, that exploration is limited by time available and economic restraints. In some cases soil conditions can change dramatically over short distances, therefore, even careful exploration programs may not locate all the variations.
- 3. If soil conditions different from those shown in this report are encountered or are inferred from other sources, then the author must be notified immediately.
- 4. This report may not be reproduced except in full. The information and site sketch in Appendix 3 shall only be used and will only be applicable for the development shown on the client-supplied information provided for this site.
- Any dimensions, contours, slope directions and magnitudes shown on the site sketch plan shall not be used for any building construction or costing calculations. The purpose of the plan is to show approximate location of field tests only.
- 6. Any changes made to these recommendations by persons unauthorized by the author will legally be interpreted at that person assuming the responsibility for the long-term performance of the footing system, effluent disposal design.
- 7. The recommendations contained in this report have not taken into consideration the long term effects of any previous, current or potential subsurface work by mining companies or potential slope instability problems. At the time of writing this report, neither our client (nor his agent) nor the local authority had made the author aware that these problems may be affecting this allotment. If a mining subsidence or slope stability assessment is required for this allotment, the recommendations of a suitably qualified geotechnical engineer should be sought.
- 8. The following documents are available from various sources and shall be read and adhered to in relation to this site:

AS/NZS 1547:2012 - On-site domestic wastewater management http://www.standards.com.au/catalogue/script/Details.asp?DocN=AS417924235393 AS/NZS 1546.1 - On-site domestic wastewater treatment units - Septic tanks http://www.standards.com.au/ AS/NZS 1546.2 - On-site domestic wastewater treatment units - Waterless composting toilets http://www.standards.com.au/ AS/NZS 1546.3 - On-site domestic wastewater treatment units - Aerated wastewater treatment systems http://www.standards.com.au/ Queensland Plumbing and Wastewater Code http://www.lgp.qld.gov.au/docs/building_codes/New%20plumbing%20laws/plumbing_and_wastewater_code.pdf Standard Sewerage Law http://www.legislation.qld.gov.au/LEGISLTN/SLS/1998/98SL099.pdf

The Land Application Area designed by CQ Soil Testing is in accordance with the relevant Australian Standards to provide the most economical solution with the intent of minimizing expense for the owner. Generally, this initial installation will be sufficient to successfully handle the load from the dwelling and/or building. Occasionally, however, all of the effluent is not absorbed or transpired due to reasons such as:

- diversion drains are not effective and stormwater enters the Land Application area
- plants used for the aid of transpiration have not reached maturity resulting in less than optimum transpiration
- water conservation is not being practiced within the household or building
- soils can vary significantly over short distances resulting in significant variations in absorption characteristics.

In such instances, enlargement of the Land Application area will be required, until all of the effluent is effectively absorbed or transpired. In the instances of minimizing costs, the builder will not have allowed for this additional area in the construction quotation. This will be an additional cost to the owner.



APPENDIX 4 MAINTAINING YOUR SEPTIC SYSTEM

The following tips will help you to save money, reduce pollution and conserve resources:

Remove accumulated sludge from the tank:

- Generally, septic tanks require periodic cleaning or pumping out of accumulated solids every 4 years. If solids are allowed to build up in the tank to a point where they pass to the effluent treatment stage they can cause problems.
- Household pipes may become filled with sewage and the subsoil soil trench system could soon become clogged with
 solids. This may cause the effluent to come to the surface, pool and cause unpleasant smells. This can constitute a risk
 to public health, particularly to children playing in the vicinity.

Minimise or manage the volume of water entering the system to improve the lifespan and operation of the absorption trench:

- Regularly check plumbing fixtures for leaking taps or toilets cisterns. Have them repaired. Ensure water from roof downpipes does not enter the system and roof water is diverted away from the effluent disposal area.
- Install water saving devices such as shower heads that minimise water use and dual flush toilet cisterns.
- If the terrain slopes down to your absorption trench ensure that surface water is diverted around the soakage area by installing a stormwater diversion trench.
- Spread large washing loads over several days to minimise the impact on your septic tank system. Plan your water usage
 so that large flows to the system in a short time are avoided, for example, operate the dishwasher and washing machine
 at separate times.

Ensure the system can be readily accessed for maintenance:

If you own a house built prior to March 1995 and your tank is difficult to access for maintenance, you may consider installing an approved access shaft to minimise future maintenance difficulties.

Do not construct driveways, buildings or paved areas over the septic and soakage system as this may result in damage to the system and access problems when the tank requires pumping out at a later date.

Use household detergents and bleaches sensibly:

The normal use of household detergents and bleaches is considered satisfactory. If in doubt about any household product suitability, consult the product manufacturer.

Don't use the system for the disposal of chemicals:

Don't dispose of medicines or strong chemicals such as pesticides and paints into the septic system. This can cause the septic tank to malfunction and may pollute groundwater.

Protect the septic tank and disposal area from damage:

If the tank and disposal area are exposed to vehicle traffic use a barrier or other means to prevent vehicles driving over the tank and soakage as this could cause damage and result in costly repairs.

Prevent mosquito breeding:

Ensure that all vents associated with the system are fitted with mosquito proof mesh and access openings are correctly sealed.

After a number of years of use, some soakage systems may fail and require replacement. The first signs of this can be soggy patches on the surface in the area where the soakage trenches are located. This can be accompanied by strong odours and blocked pipes. This can constitute a health risk and advice should be sought from a registered plumber to confirm the cause. If the trench requires replacement or the system needs to be altered in any way, the local council Environmental Health Officer should be consulted. A malfunctioning effluent disposal system can constitute a risk to public health and in some cases result in action being taken by the relevant authority.

Note: Odours may occur on initial use of the system. If this becomes a problem consult your local council or the Department of Health.

Table 3 – Water Balance Calculations

EVAPO-TRANSPIRATION ABSORPTION

			(T4.2A2)	(T4.2A2)
(AS1547:2000)	0.5	0.75	8 mm/day	0.12-0.5 mm/day
DESIGN DATA	Retension Rate:	Evapotranspiration Factor:	Design Loading Rate:	Indicative Permeability:
۲.	y: 5	e: Light Clay	e: Strong	by: 0.12 m/day
SITE DAT	Soil Categor	Soil Textur	Soil Structur	Measured Permeabilit

http://www.bom.gov.au/climate/averages/tables/cw_039123_All.shtml

175.(243.0 384.(67 44 ц 7300. ю ğ Ave 2099.8 4615.8 2920.0 404.1 87600.0 808. 69. 1737 Sum 104.3 434.6 7440.0 3 238.7 52 248.(<u>~</u> 6 Dec 8 228.0 33.2 ß ŋ ß 434. 7200. 66. ģ 8 240. N٥۷ 49.5 210.8 24.8 31 167.4 6.8 248.0 434.1 7440.0 ~ ő 24.5 174.0 401.8 12.3 29.0 5.8 240.0 17.9 8 7200.0 Sept 08.5 4 4 13.6 136.4 248.0 370.9 7440.0 õ 20 Aug 3.6 3 31.8 15.9 111.6 248.0 21.6 7440.0 343.7 . 98 ٦u 18.9 30 37.8 05.0 с Э 7200.0 8 240. 326. 2 Jun 05.4 45.3 248.0 352.5 31 22.7 127.1 7440.(4 2 Мау 159.0 8 43 21.5 35.0 5.3 240.0 377.5 7200.0 0 April 52.4 167.4 6.2 192.2 248.0 387.9 31 19.2 7440.0 104 Mar 187.6 224.0 339.6 19.8 28 72.0 6720.0 144 165.2 G Feb 129.8 64.9 198.4 229.4 248.0 412.5 7.4 õ 18.0 7440.0 Jan isposal Rate per month (ltr) E multiple ean daily evaporation (Evapotranspiration (mm) AREA CALCULATION Retained Rainfall (mm) Effluent per month (ltr) DLR per month (mm) Mean rainfall (mm) Pan Evaporation Area (sq.m) Days

00

STORAGE CHECK

		Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Area (sq.m)	20												
(Application Rate (mm)		372.0	336.0	372.0	360.0	372.0	360.0	372.0	372.0	360.0	372.0	360.0	372.0
(Disposal Rate (mm)		412.5	339.6	387.9	377.5	352.5	326.1	343.7	370.9	401.8	434.1	434.9	434.6
Excess Effluent (mm)		-40.5	-3.6	-15.9	-17.5	19.6	33.9	28.3	1.1	-41.8	-62.1	-74.9	-62.6
(Stored Effluent Increase (mm)		-135.0	-12.0	-52.8	-58.3	65.2	113.0	94.3	3.8	-139.2	-206.8	-249.5	-208.5
Effluent Depth for month (mm)		0.0	0.0	0.0	0.0	0.0	65.2	178.2	272.5	276.3	137.2	0.0	0.0
(Effluent Depth Total (mm)	0	0.0	0.0	0.0	0.0	65.2	178.2	272.5	276.3	137.2	0.0	0.0	0.0

Depth of Gravel	200 mm	
Depth of Sand	200 mm	
Depth of Storage Area	400 mm	
Freeboard	50 mm	
Permitted Depth of Effluent	350 mm	

Area of ETA Bed

2

SL			
3ed Dimension	Vo. of Beds	3ed Length	3ed Width

8.0 m 2.5 m

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info@cqsoiltesting.com.au www.cqsoiltesting.com.au Email: Website:

Job No: CQ17185

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EVO Portables Cyclone Rated C2(W50C)

6 Star Energy Efficient (subject to site placement)

