Surf COAST SHIRE

Moriac Septic Study Report

June 2021

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Moriac Septic Study

Table of contents

Definitions

AWTS	Aerated Wastewater Treatment System
EHO	Environmental Health Officer
EPA	Environment Protection Authority Victoria
OPLE	Officer for the Protection of the Local Environment
RRV	Regional Roads Victoria (formally VicRoads)

Executive Summary

Moriac is an unsewered township located in the Surf Coast Shire Council. Moriac was identified in Council's Domestic Wastewater Plan developed in 2006, as having the highest development activity and potential of the Shire's unsewered townships.

The soils and landscape are naturally poor for onsite domestic wastewater management with heavy clay sub soils and gentle slopes resulting in slow natural runoff and increased rainfall infiltration. There has been examples of effluent leaks from septic tank systems into the street and stormwater system. Some of these incidents relate to mismanagement of septic tank systems, whilst other legacy systems are in place where this was permitted by the Environment Protection Authority Victoria (EPA) to occur at the time of their installation prior to 1989.

There are two clusters within the township that have been identified as problematic for onsite wastewater disposal. The original part of the township towards the corner of Cape Otway Road and Hendy Main Road, comprises a number of properties that are around 1000m^2. These smaller lot sizes were historically set when houses tended to be smaller and black water (toilet waste water) was treated and retained onsite only, whilst other waste water known as sullage or grey water (kitchen, shower, laundry and bathroom waste water) was allowed to discharge into drains or roadsides. The second cluster is to the South of the township around Buttercup Drive and Bluebell Close, comprising of a number of properties around 2000m^2 developed in the 1990's.

This study focused on 212 properties within the main township of Moriac, immediately to the West of Hendy Main Road stretching to and including Lloyd Mew and to the South of Cape Otway Road. There were a couple of properties on smaller allotments to the North side of Cape Otway Road that were included due to their smaller sizing and potential impact on the townships stormwater system.

A thorough desktop assessment was conducted of the identified properties, and Council records were located for 83% of the properties, as well as a review of the history of septic tank related complaints received by Council for the township. 45 property audits were conducted for those properties that lacked Council records, information was missing, or where potential offsite discharges were identified.

The majority of the Moriac Township drains to the stormwater infrastructure along Hendy Main Road. This infrastructure is split into two systems. North of 802-804 Hendy Main Road up to Cape Otway Road drains North East via an underground drainage network into the rail reserve north of the primary school. The Southern section of the network drains to the South along the roadside via a combination of underground and above ground drainage systems which discharges to Thompson Creek to the South of the township. The Southern section of the network captures flows from the majority of the township to the West. Stormwater often surfaces from the Hendy Main Road infrastructure during significant rainfall events and over footpaths, this water can sit for many days before it subsides.

Stormwater sampling was conducted on two separate dates in August/September 2019. This sampling was undertaken both after significant rainfall and after a relatively dry period. 16 samples were taken in total and human faecal contamination was detected (albeit in extremely low levels – 0.002% of the levels expected in treated effluent) towards the Southern end of the Hendy Main Road

drainage infrastructure. Human faecal contamination was not detected in the Thompson Creek on either occasion which is where the stormwater ultimately drains.

The stormwater sampling was qualitatively inconclusive except to indicate that at times there are levels of human waste present within the stormwater system, and the nutrient levels indicate that there is potential for contamination due to greywater discharges.

The desktop and property audits identified that Sand Filters were by far the most common system in the township and a major concern is a high percentage of these are past or approaching their life expectancy (upwards of 80% of the total sand filter systems). More than 50% of the total septic tank systems in the township were estimated to be disposing of wastewater via a flexible hose which is a risk to humans and animals if they come into contact, or can be easily diverted beyond the property boundary to neighbouring properties or into the street. Around 17 properties were identified to likely be discharging some form of wastewater beyond their property boundaries. These properties were generally on the smaller blocks where upgrade to a system of current day standards would be impossible due to a lack of the required land due to lot size, and established structures such as houses, sheds and swimming pools.

Recommendations from the study are:

- Provide education to residents on servicing/maintenance of systems and responsibilities under the new Environment Protection Act 2017 due to come into force on 1 July 2021.
- Implement ongoing sampling program of Thompson Creek and the Hendy Main Road stormwater infrastructure to ensure any potential contamination is monitored.
- Investigate drainage infrastructure in the older part of the township and identify any improvements that can be instigated to alleviate storm water run-off issues.
- Investigate potential upgrades to drainage infrastructure on Hendy Main Road in conjunction with Regional Roads Victoria (RRV) to minimise water pooling and surfacing over footpaths.
- Consider feasibility of a Water Sensitive Urban Design (WSUD) asset to be installed at the end of the Hendy Main Road Stormwater infrastructure to improve water quality prior to discharging to Thompson Creek.
- Provide this report to Barwon Water and advocate to undertake a feasibility study into providing a reticulated sewer, factoring in future developments and the Moriac Structure Plan.
- Update existing septic tank register and maintenance program for all Council owned septic tank systems.

Background

All properties in Moriac rely on septic tank systems. The systems vary according to when they were installed with some dating from the 1950s. There have been examples in the town of effluent leaks into the street and into the stormwater system.

To operate a septic tank system the property owner must have a permit from Council. All septic tank systems must be capable of treating and retaining wastewater inside of that property.

Property owners are responsible for ensuring that they continue to comply with permit conditions over the period of time they use a septic tank. Failing septic tanks can cause environmental, public health and amenity risks. It's essential these risks are managed appropriately to protect the environment and human health.

Council's EHO inspecting Thompsons Creek.

Introduction

Moriac is an unsewered township located on the Cape Otway Road. The main Moriac Township comprises of just over 200 properties with a population of 782[1]. There are two clusters within the township where the size of allotments are of particular concern for onsite wastewater disposal. The original part of the township towards the corner of Cape Otway Road and Hendy Main Road, comprises a number of properties that are around 1000m^2. These smaller lot sizes were historically set when houses tended to be smaller and black water (toilet waste water) was treated and retained onsite only, whilst other waste water known as sullage or grey water (kitchen, shower, laundry and bathroom waste water) was allowed to discharge into drains or roadsides. The second cluster is to the South of the township around Buttercup Drive and Bluebell Close, comprising of a number of properties around 2000m^2.

The majority of the township drains to a storm water main along Hendy Main Road which eventually discharges to Thompson Creek to the South of the township. During times of heavy rain water often surfaces at points along this storm water main, in places, pooling over the footpath and can sit for days before draining away.

Council's Domestic Wastewater Management Plan was developed in 2006[2], this report identified Moriac as having the highest development activity and potential out of the Shire's unsewered townships. It was estimated that around 10% of properties discharged wastewater offsite and that a large portion of the existing septic tank systems were aging and requiring replacement/upgrade in the proceeding 10 years. Recommendations in this report for Moriac included education to residents regarding maintenance and using their system in-line with permit conditions. It was concluded that sewering of the township was not justified at the time of the report, but recommended to monitor the situation in to the future as the township ages and more systems fail.

A township specific Domestic Wastewater Management Plan (DWMP) for Moriac was developed in May 2013 by Geocode and van de Graaff and Associates[3]. This document found that the soils and landscape are naturally poor for onsite domestic wastewater management. Heavy clay subsoil, present in the entire township, poses serious limitations for onsite wastewater disposal along with extremely gentle slopes in large parts with slow natural runoff and increased rainfall infiltration. The two clusters of small allotments mentioned earlier were found to not have enough room to accommodate a house, associated outbuildings and other structures and a septic tank system sized under the current day modelling. More advanced disposal methods with smaller footprints such as mound systems were found to be impractical to retrofit.

Due to the size of some of the historical allotments and the poor drainage properties of the soil there is a known history of failing septic systems and offsite discharges within the township. The stormwater infrastructure struggles to cope with significant rain events and therefore initiated the need for this study. This study is an information and evidence gathering project to gain an understanding of the storm water and septic systems in Moriac, how they operate, and the risks they present to the environment and people.

[1] Australian Government – Bureau of Statistics – Census Data Quick Stat 2016

[2] Surf Coast Shire Council - Domestic Wastewater Management Plan – Final Report - August 2006

[3] Surf Coast Shire Council – A Domestic Wastewater Management Plan in Moriac – May 2013

Methodology

The methodology for this project included the following steps:

- Property identification
- Review of septic tank complaints
- Desktop Study
- Community Consultation
- Property Audits
- Stormwater Sampling
- Hendy Main Road Stormwater Drainage Catchment and Capacity Analysis

Property identification

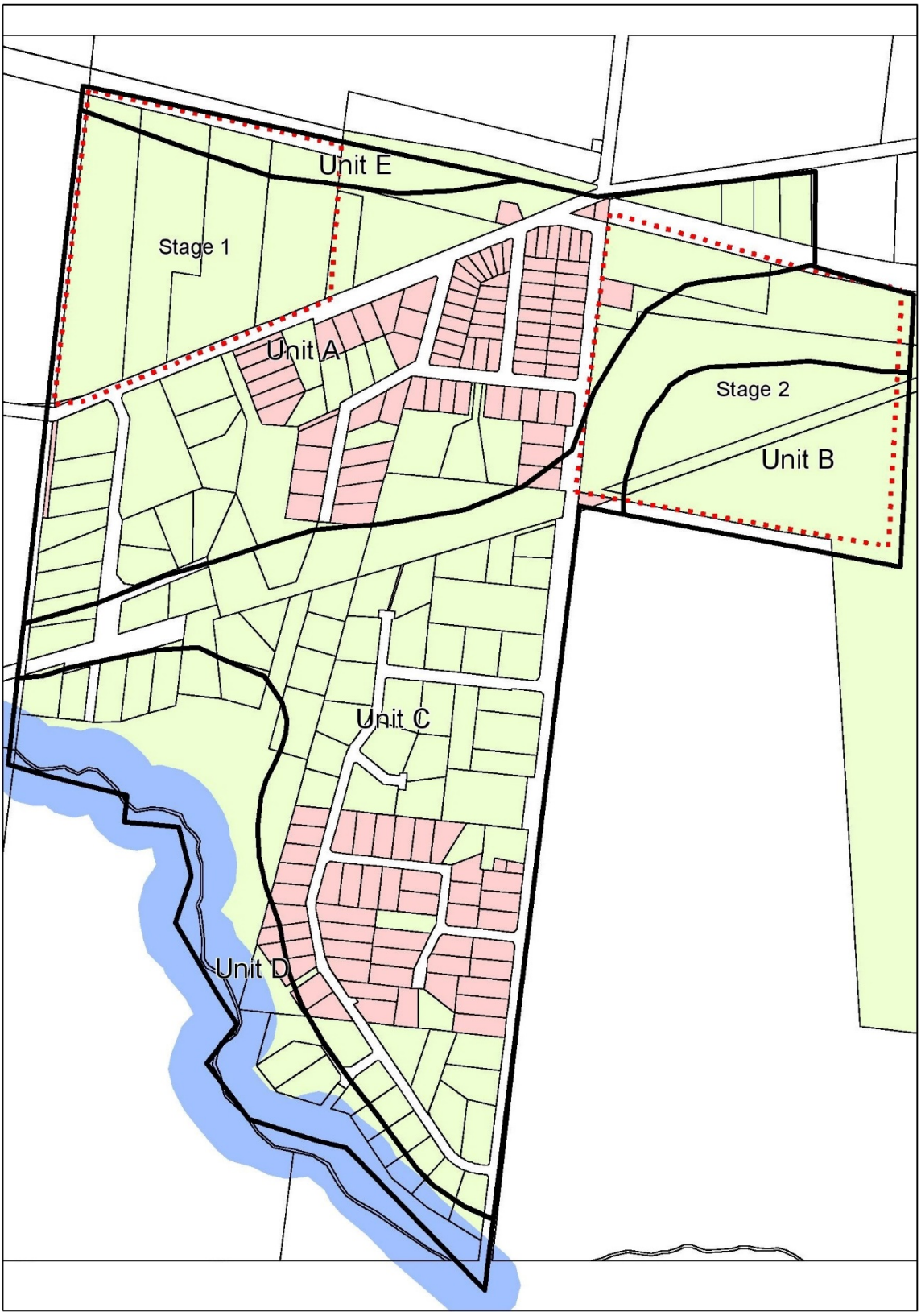
The focus of the study was the main township of Moriac, immediately to the West of Hendy Main Road stretching to and including Lloyd Mew and to the South of Cape Otway Road. There were a couple of properties on smaller allotments to the North side of Cape Otway Road that were included due to their smaller sizing and potential impact on the townships stormwater system.

There are a number of larger properties on the fringe of the township that were excluded from this study. These properties are on much larger parcels of land and therefore it can be assumed that their septic tank systems will be less likely to discharge or have significant impacts beyond their property boundaries. It should be noted that the developing 'Hinterland Estate' was also excluded from the study area.

The study identified 212 properties within the township to be audited.

The properties include the original township towards the corner of Cape Otway Road and Hendy Main Road which consists of historically smaller allotments (1000m^2 or less). The larger lots extending beyond the original township were sub-divided and developed in more recent times (approximately 30 years ago).

The following map is taken from the Moriac Domestic Wastewater Management Plan that was developed in May 2013. This map shows in red the two clusters of properties within the township that consists of smaller parcels which are a concern for onsite wastewater systems.



Map of Moriac Township. Properties highlighted in red are a concern for on-site wastewater management

Reference: Moriac Domestic Wastewater Management Plan, May 2013.

Review of septic tank complaints

A review of septic tank related complaints was conducted to determine the history of issues and non-compliances within Moriac. A total of 12 complaints were documented in Council's current public health database, dating back to September 2011. Of these complaints, 10 related to moveable/flexible hoses connected to systems discharging beyond the property boundaries – these were addressed at the time the complaints were made. One complaint related to a large commercial failing system that in turn was upgraded. The final complaint related to a legacy system that was found to discharge directly into the stormwater which contributed to the initiation of this study.

Desktop study

A through search was conducted of Council's database and archives for historical septic tank permits for the individual properties. Records went back to the 1970's and in addition to Surf Coast Shire Council records, there were a number of permits that were issued by the pre-amalgamation local government authority for Moriac – the Shire of Barrabool (prior to 1994).

All historical permits were collated and reviewed by an Environmental Health Officer (EHO) to identify the age of the system, type of system, locate plans and to identify any potential offsite discharges.

Of the 212 properties identified, 177 properties (83%) had a permit that was able to be located. There was some difficulty in particular finding older permits along Cape Otway Road and Hendy Main Road as the records pre-dated street numbers.

There were constant themes that came out of the desktop audit and these related to the septic tank standards at the time of development. In the oldest part of the township, the two blocks between Hendy Main Road and Bolton Street, it appears common that systems were approved to treat wastewater and then dispose offsite into the street, or split black water and grey water and discharge the grey water to the street. This was a common practice of the time in similar townships across Victoria[4].

Prior to the early 2000's, effluent was commonly distributed via flexible hoses/sprinklers that the occupier could move around the yard as required. Home owners were also able to connect their own irrigation systems to the septic tank system and therefore it was often not checked by a Council officer or a qualified plumber. Due to this, permits reviewed from prior to this time detailed information on the type of septic treatment system and location, but do not provide details on the type of irrigation or disposal system.

The desktop study identified a large number of secondary treatment systems within the township. 135 sand filter systems and 32 Aerated Wastewater Treatment Systems (AWTS) were identified through this process. Leaving only 9 primary treatment systems.

34 systems were identified to have a fixed sub-surface irrigation field which is the current preferred method of disposal. The desktop review was unable to ascertain the disposal method of a large portion of the permits that were reviewed, 102 in total.

Sand filters were by far the most common system installed likely due to these being the preferred systems by local plumbers/drainers. Sand Filters have a 15-20 year lifespan, therefore the age of sand filters is a possible concern as a large portion of them are between 21-30 years old. Less than 20 of the Sand Filters in the township have been installed within the last 10 years. It is known that a number of sand filters may have had their sand replaced over the years as local plumbers have advised they have

[4] Victorian Auditor General – Protecting our environment and community from failing septic tanks – June 2006

carried out these works, but Council does not have a record of when and which properties where this has occurred.

Following the desktop audit there were 102 properties identified where either Council had no record of a septic tank installation, or existing records did not identify the disposal method. Therefore these properties became the focus of the property audits.

Property audits

Information was provided to all property owners/occupiers within the study area in September 2019. The information included advice about the study and septic tanks and that a Council officer would make direct contact with individuals if access to their property was required. Refer to Appendix 3 for a copy of the community information sheet that was distributed.

Property audits were conducted by a Council EHO in October 2019 through to February 2020. Properties prioritised for auditing were those with no records or where the method of wastewater disposal was unknown. A number of systems are located in the front yards of properties and able to be observed from the street without accessing the property. Where this was not possible permission was sought from the property owner or occupier to enter the property or meet to audit the system.

In addition to property audits, a number of phone conversations with property owners was undertaken to discuss their knowledge of the septic tank system. In the original part of the township where older septic tank systems existed, they were generally below ground and therefore auditing of each of these properties was unable to be undertaken as excavation would be required to confirm location and type of septic tank system.

Where the septic tank system was unable to be identified or located, reliance on any old permits or the owner's knowledge of the system were the only information that could be used to identify where the system may be. Septic tank systems installed within the last 10-15 years, such as treatment plants and sand filters tend to have pumps and electronic components which are finished above ground level for maintenance and therefore these types of systems tend to be more easily located.

For properties where Council had no records, a site plan was drawn up based on observations and discussions with the owners so that a site plan is available for each property within the township as to the location of the system (if known). Photos were taken during each audit of any septic tank system components that were identified.

A total of 45 property audits were conducted, and an additional 2 phone interviews were conducted where it was determined a physical audit was not necessary as all components of the system were below ground and the owners had little knowledge of where the system was located. The sand filter systems that were audited due to an unknown disposal method were found mainly to have a flexible hose/sprinkler attached to the pump well which the resident moved around the yard. This was found to be a common disposal method within the township and likely to be used in most cases therefore, not all of these identified properties needed to be physically audited.

In addition to the property and desktop audits, it was noted that 30 of the septic permits within the study area have been issued within the last 10 years and therefore these systems have been recently inspected and issued plumbing compliance certificates which ensures they have been installed as per current day standards.

Stormwater sampling

The majority of the Moriac Township drains to the stormwater infrastructure along Hendy Main Road. This infrastructure is split into two systems. North of 802-804 Hendy Main Road up to Cape Otway Road drains North East via an underground drainage network into the rail reserve north of the

primary school. The Southern section of the network drains to the South along the roadside via a combination of underground and above ground drainage systems which discharges to Thompson Creek to the South of the township. The Southern section of the network captures flows from the majority of the township to the West.

A Council EHO liaised with the EPA Officer for the Protection of the Local Environment (OPLE) and Council's infrastructure unit to understand the drainage network within the Moriac Township. Ten sampling locations were identified to capture a good representation of Moriac's stormwater system. These locations included sampling points identified and recommended in Council's 2006 Domestic Wastewater Management Plan.

Council's EHO liaised with the EPA OPLE and with ALS laboratories (NATA accredited) to determine what type of testing would be conducted in order to obtain meaningful data for this project. It was determined for the first round of sampling that testing be conducted of the following microbial, physical and nutrient parameters;

- Quantitative Human Bacteroid copies/L
- Biochemical Oxygen Demand (BOD) mg/L
- Escherichia Coli (E. Coli) organisms/100mL
- Enterococci organisms/100mL
- Total Nitrogen mg/L
- Nitrate mg N/L
- Total Suspended Solids mg/L
- Total Kjeldahl Nitrogen mg N/L
- Total Phosphorus mg P/L

The first round of sampling was conducted on 12 August 2019 after significant rainfall. These samples were taken from surface water or from accessible stormwater pits where access was available without the need to lift pit lids. This sampling also included a sample upstream and downstream of the township from Thompson Creek and a sample from Raven's Creek to the North. The rainfall data for the four days leading up to the sampling date, as recorded at the Geelong Racecourse (nearest relevant dataset) was 6.8mm, 3.2mm, 5.6mm and 19.2mm[5]. Note that the sample numbers 4 and 5 were skipped administratively when numbering the samples for the laboratory.

[5] Australian Government – Bureau of Meteorology Website - http://www.bom.gov.au/

Sampling sites collected on 12 August 2019

Refer to Appendix 1 for photos of the sampling sites.

A second round of sampling was conducted on 4 September 2019. This round was carried out at points along Hendy Main Road from inside the closed stormwater drain system. Pit lids were removed at six locations to obtain the samples as this round was conducted after drier conditions. The rain data for the four days leading up to the second round sampling date was 0.2mm, 0mm, 3.2mm and 0.2mm. The second round of sampling focused on Quantitative Human Bacteroid testing only and not the full suite of parameters, this was in order to detect any traces of human waste within the stormwater system.

Sampling sites collected on 4 September 2019

Refer to Appendix 2 for photos of the sampling sites.

There was interest in sampling the Northern section of the Hendy Main Road stormwater system however a suitable sample point could not be identified. An open grate is on the corner of Hendy Main and Cape Otway Road but to remove the lid would involve traffic control for safety reasons, there were concerns that it may be hard to extract enough water from this point. The outflow from the Northern side of the Hendy Main Road system discharges into the rail reserve north of the school but no obvious collection point could be located.

Hendy Main Road stormwater drainage catchment and capacity analysis

Following a number of queries from residents regarding flooding along Hendy Main Road, Council engaged an engineering consultant to undertake a review of the drainage infrastructure. Hendy Main Road falls under RRV management responsibility, however there is Council managed municipal drainage infrastructure on the street. The engineering assessment found that $892,000 worth of potential infrastructure upgrades would be required in order to bring the infrastructure in line with current day standards. The report also outlined a number of smaller works that could be undertaken to reduce the frequency of flooding, including improvements to the RRV managed table drain and recommissioning a cross road culvert recently decommissioned as part of a new development.

Council officers have sent the report to RRV and are seeking a meeting to discuss future upgrades and potential funding avenues.

Council's EHO collecting a water sample from storm water drain along Hendy Main Road.

Results and discussion

Desktop and property audits

The desktop study and property audits identified that there is a variety of systems within the township with the majority of properties having a secondary treatment system installed. This means that the effluent is treated to a higher standard (assuming the system is maintained and working well) before it is disposed to land. Only 22 properties were identified to have a primary treatment system i.e. a standard septic tank system and sub-soil trenches or a split system with greywater separation.

The most common system within the township was sand filters which are installed at 151 of the properties within the study area (71%).

Sand filters generally have a 15-20 year life, the study revealed that of the sand filters within the township at least 51 of the systems are greater than 20 years old. A further 15 system ages were unknown which are assumed to be likely older than 20 years. A further 66 of the sand filters were between 11 and 20 years old and would be approaching the end of a typical system life in the next 5-10 years. A number of these sand filters may have had their sand replaced at some stage, discussions with local plumbers revealed that they have replaced sand filters in the Moriac township over the years, Council does not hold any records to identify which individual systems have been replaced.

Sand Filter Age

Age of Sand Filter	<5 years	6-10 years	11-20 years	21-30 years	>30 years	Unspecified
Number	7	13	66	29	21	15
Total %	5%	8%	44%	19%	14%	10%

Although the level of treatment was found to be mainly to a secondary level, an area of concern identified during the audits was the amount of systems being discharged to land via a flexible hose/sprinkler. The study identified 63 systems using this disposal method, as well as another 55 secondary treatment systems with an unknown method of disposal. It would be a reasonable assumption that the majority of these would also have a flexible hose/sprinkler attached to the system. This means more than 100 properties within the study area that are likely to be disposing effluent to land via this method (approximately 50%). This method of disposal is no longer an approved method of disposal. The concern with this method is that humans and animals can come into contact with the effluent and hoses can be easily diverted into stormwater drains or beyond/across property boundaries. The review of wastewater related complaints within Moriac confirmed this to be a major wastewater related issue within the township. 42 systems were confirmed in the study to be disposing below ground as required under current day standards. This is common practice with the majority of systems being sand filters, as it is easy and cheap to connect a hose to the outlet of the pump as they are easily accessible by removing the pump well lid.

Following the mail out to all properties regarding this project, it was noted that a number of hoses that were coming from properties into the street were removed which were likely some sort of wastewater discharge. One application was lodged by a resident which in turn resulted in their failing system being upgraded. There were two systems identified where absorption lines were damaged and/or blocked and these were subsequently repaired.

Discussions with residents identified that there are drainage issues within the township, in particular, streets such as The Broadway and Bolton Street that do not have any storm water infrastructure on

the street. Owners have advised that the soil in these areas are heavily water logged year round, and even in drier months shallow holes will expose groundwater. Residents have advised that during a wet winter such as 2016 (second wettest winter on record according to the Bureau of Meteorology website), top soil becomes water logged and a lot of the septic systems do not cope. Residents have reported that a number of properties have valves to divert their effluent during wetter months beyond their property boundaries. As these are below ground it is an impossible task to identify where such issues are located.

The desktop review identified that there are a number of legacy systems (in particular in the old part of the township) where systems were approved to discharge directly into the storm water infrastructure. It appears that the properties along the East side of The Broadway obtained consent from the properties between them and Hendy Main Road, to be able to connect drainage through their lots and into the stormwater infrastructure. It is believed that the majority of these systems are split systems, where the black water goes through a small septic tank and trench onsite and the grey water is plumbed directly into the storm water. As these systems are more than 30 years old and are installed below ground, it was not possible to audit these systems as part of this project. This information was based on permit records, previous history of complaints/issues and discussions with local residents and plumbers who confirmed some of these scenarios.

Another common scenario that was typically found in historical permits in Bolton Street, is sand filters were installed to treat wastewater to a higher standard and then treated effluent was discharged directly into the street drains. Some of these hoses were found as part of this study to still be in place.

Some permits in the Daniel Mews area were found to be approved for sand filter systems to discharge via a flexible hose into easements and table drains. No systems were identified as part of this study as still discharging in this way. Given these lots have more land available it is likely that hoses have been relocated into the property boundaries, as over time this has become a less accepted method of disposal.

The study identified around 15 properties with fixed sprinkler systems. This was a common method for disposal prior to around 10 years ago. Although this is a better option than a flexible hose, as they cannot be redirected beyond the property, these disposal methods still pose a risk to animals and people that come into contact with the effluent.

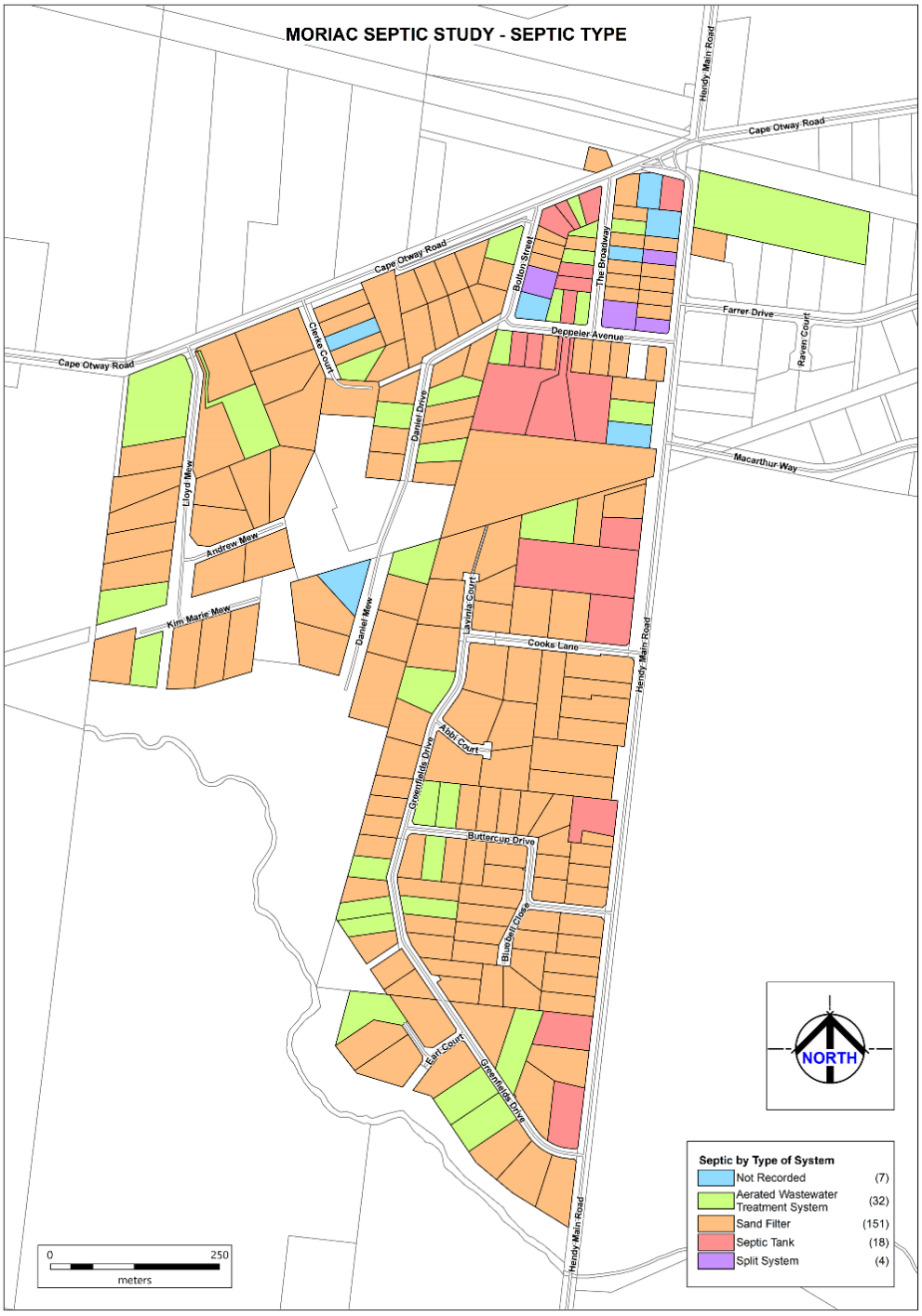
A problem encountered with the smaller clusters of properties within the township is that when an owner wants to upgrade a system they can be heavily restricted due to lack of available land for effluent disposal. This is due to the smaller block sizes, as well as structures such as houses, sheds, swimming pools etc., that take up the available space. Current day standards for effluent disposal require considerable land in which a number of these lots could not meet. The 2013 Moriac Domestic Wastewater Management Plan identified that 32% of the lots within the township would not have enough physical land to comply with an irrigation system sized on current day standards. Therefore, when property owners wish to upgrade systems, Council needs to work with them to ensure an upgrade is undertaken that improves the situation within the constraints of the land. This is particularly problematic on the smaller lots, which were likely approved on the provision that some offsite discharge was undertaken (as accepted at the time of sub-division).

The audit program identified potentially 17 properties that may have offsite discharge arrangements. Given that the older traditional systems are all below ground and the number of older systems within the township, it is likely that the actual number is much higher. The offsite discharges were identified mainly through legacy records, previous complaints/issues and discussions with plumbers and residents. Due to the nature of the systems being installed below the surface there was minimal physical observations of this occurring as part of the audit program.

Council's EHO inspecting an effluent irrigation area installed to current day standards using a method called pressure compensating sub-surface irrigation.

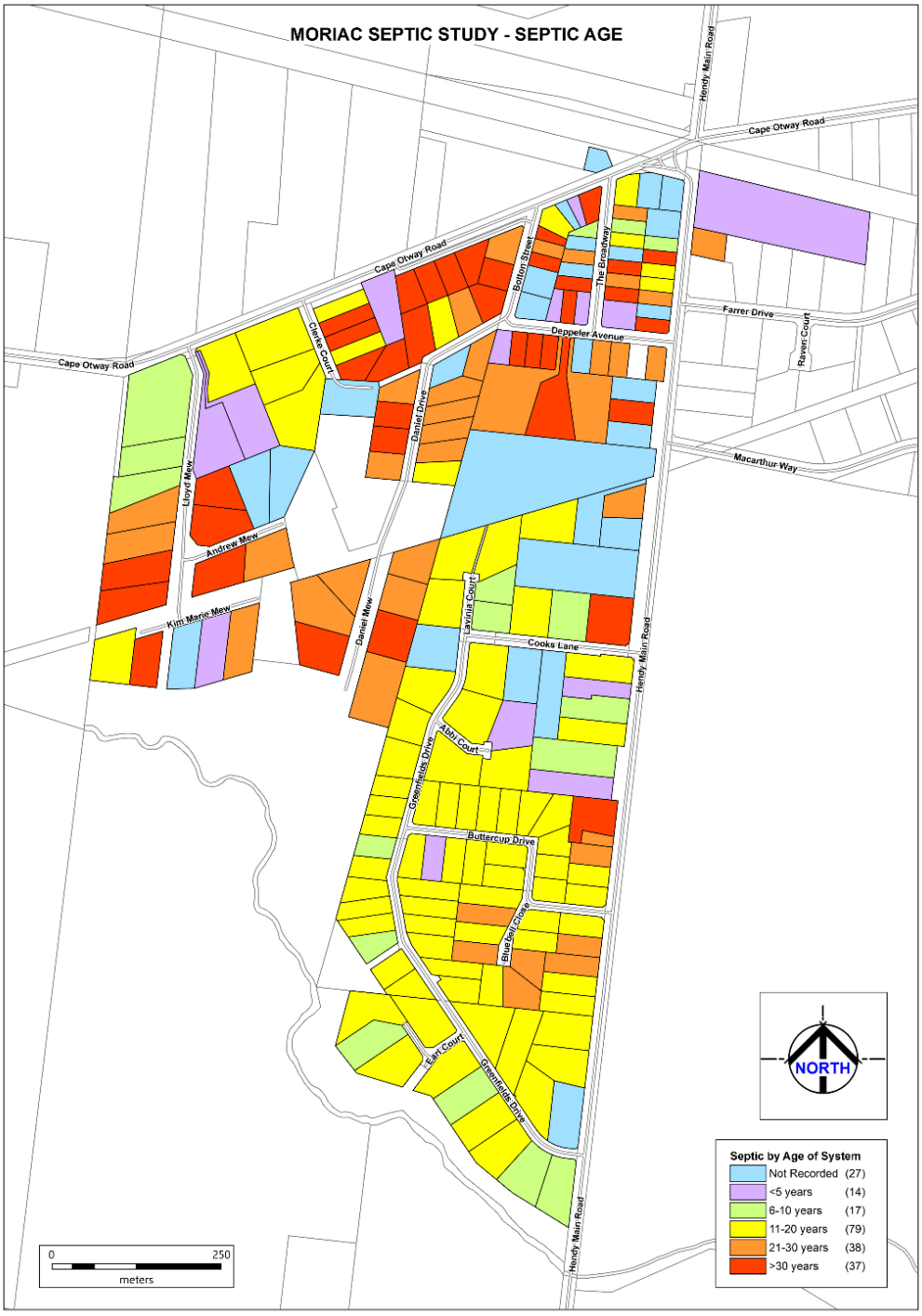
Septic Systems by Type

Type of System	AWTS	Sand Filter	Septic Tank	Split System	Unspecified
Number	32	151	18	4	7
Total %	15%	71%	9%	2%	3%



Septic Systems by Age

Age of System	<5 years	6-10 years	11-20 years	21-30 years	>30 years	Unspecified
Number	14	17	79	38	37	27
Total %	7%	8%	37%	18%	17%	13%



Stormwater sampling

The first round of sampling conducted on 12 August 2019 results were as follows:

REF.	HUMAN BACTEROID	BOD	E. COLI	ENTEROCOCCI	TOTAL NITROGEN	NITRATE	SUSPENDED SOLIDS	TOTAL KJELDAHL NITROGEN	TOTAL PHOSPHORUS
	copies/L	mg/L	orgs/100mL	orgs/100mL	mg/L	mg N/L	mg/L	mg N/L	mg P/L
1	Not Detected	3	1300	2100	6.3	0.98	32	5.4	0.43
2	Not Detected	2	4400	9800	9.5	4.9	3	4.6	0.55
3	Not Detected	< 2	4400	24000	10	4.4	4	5.8	0.74
6	Not Detected	3	580	1600	13	9.5	X	4	0.5
7	Not Detected	< 2	97	680	7.5	4.5	< 2	3	0.16
8	Not Detected	< 2	170	560	7.1	3.2	16	3.9	0.14
9	Not Detected	3	1000	1500	5.7	0.6	36	5.1	0.43
10	Not Detected	2	17000	> 24000	3.6	0.21	12	3.4	0.24
11	Not Detected	< 2	570	600	4.4	1.4	2	2.9	0.11
12	1800	3	> 24000	> 24000	13	9	< 2	4.5	0.57

- Short term indicators and objectives for water-based recreation – Single sample **E. *coli***: ≤ 550, **enterococci** ≤ 500
- Omitted Suspended Solid result for sample number 6 as the sampling container was scraped on the base of the pit due to low level of water and is not a true reflection

The indicators of faecal contamination (E. Coli and enterococci) exceeded the short term levels recommended for water-based recreation in most cases. Human faecal contamination was isolated to location 12. The elevated levels of E. Coli and enterococci are likely to be associated with non-human sources such as dogs and or birds thus posing a lesser risk to human health. Nutrient concentrations were also low across the board supporting the previous conclusion.

The request was sent to the Environment Protection Authority Victoria, Applied Science Division for interpretation of results. The following advice and commentary was provided:

"Sampling points to identify presence of greywater should be selected based on history of known hotspots, visual inspection for any pooling of greywater during dry period, location of greywater discharge points and presence of odour. To confirm presence of greywater, a number of sampling events should have been carried over a period of time both during wet and dry weather conditions. Wet weather average Total Nitrogen (TN) concentration in Metropolitan Melbourne range from 0.50 to 3.5 mg/L and average Total Phosphorus (TP) concentration range from 0.03 to 0.42 mg/ L as per the report "New insights into the quality of urban storm water in South Eastern Australia". Provided test result indicate higher TN concentrations than typical stormwater concentration and TP is within expected range. However microbiological quality are higher. More targeted sampling over a period of time is required to confirm or otherwise of greywater contamination. In conclusion, test results indicate potential contamination of stormwater with greywater. To conclude with certainty of greywater contamination, more sampling events (at least 3 to 4) should be carried out both during wet and dry weather conditions."

The second round of sampling conducted on 4 September 2019 results were as follows:

REF.	HUMAN BACTEROID
	copies/L
1	Not Detected
2	Not Detected
3	Not Detected
4	35619
5	Not Detected
6	Not Detected

The human bacteroid results for each sampling run were compared to some benchmark levels to provide some context. ALS laboratories provided some expected levels from a relevant publication[6] The expected levels for pooled human faeces, raw sewage, septic waste water and treated effluents were 5.8 X 10^9 gene copies/g, 1.7 x 10^9 gene copies/L, 8.0 x 10^8 gene copies/L & 2.1 x 10^7 gene copies/L respectively.

Although both detections of human marker level were relevant, the qualitative reading detected in sample 4 on 4 September 2019 is a better indication as the previous sample was heavily diluted by rain water. The qualitative reading from this sample of 35619 copies/L, is less than 0.002% of the level you would expect to find in treated effluent. Therefore, although the human marker was detected, it was at a very low level. It should also be noted that the sampling location where it was originally detected in the surface water was resampled in the second round, the follow up sample was taken from in the stormwater pit and there was no detection. This indicates that the level detected was possibly due to runoff contamination. The second detection of the marker, was down slope of the stormwater system from the first detection, yet it was not found in the same location twice. It should be noted that no levels were detected in Thompson Creek in both rounds of sampling so it appears that there is not a major environmental contamination issue in the Creek. It was surprising that no human marker was detected in the Northern part of the Hendy Main Road stormwater network where the majority of the legacy systems exist that are believed to discharge directly into the stormwater infrastructure.

Given the inconsistent results, the sampling results were qualitatively inconclusive except to indicate that at times there are levels of human waste present within the stormwater system, and the nutrient levels indicate that there is potential for contamination due to greywater discharges. A more comprehensive sampling program would need to be conducted over time to obtain more conclusive results. If this was to occur, it would be advantageous to obtain some samples from further north in the stormwater infrastructure at the Cape Otway Road intersection and in the reserve next to the railway line.

[6] Ahmed *et al.* 2016 – Current Status of Marker Genes of Bacteroides and Related Taxa for Identifying Sewage Pollution in Environmental Waters

Recommendations

- Provide education to residents on servicing/maintenance of systems and responsibilities under the new Environment Protection Act 2017 due to come into force on 1 July 2021.
- Implement ongoing sampling program of Thompson Creek and the Hendy Main Road stormwater infrastructure to ensure any potential contamination is monitored.
- Investigate drainage infrastructure in the older part of the township and identify any improvements that can be instigated to alleviate storm water run-off issues.
- Investigate potential upgrades to drainage infrastructure on Hendy Main Road in conjunction with RRV to minimise water pooling and surfacing over footpaths.
- Consider feasibility of a WSUD asset to be installed at the end of the Hendy Main Road Stormwater infrastructure to improve water quality prior to discharging to Thompson Creek.
- Advocate to Barwon Water regarding this report and consideration of feasibility study into sewer, factoring in future developments and Moriac Structure Plan.
- Update existing septic tank register and maintenance program for all Council owned septic tank systems.

Council's EHO inspecting recently installed pump pit as part of a sand filter system.

Moriac Septic Tank Action Plan

Strategy	Action	Lead	Supporting	Priority	Timeframe	Resources/ Funding
Education	Provide information and education to property owners regarding: • Outcome of study • The environmental and human health risks of aging and failing septic systems • Importance of desludging and maintenance of septics systems • Planning for upgrades of septic tank systems • Maintenance and replacement of sand in sand filter systems • Importance of regular servicing of AWTS • The risks associated with the use of flexible hoses/sprinklers. The importance of avoiding contact and to ensure hoses/sprinklers are positioned so that they do not discharge beyond property boundaries or into storm water infrastructure.	Environmental Health Unit	EPA Communications and Community Engagement Unit	High	December 2021	Existing resources
	Promote improvements, upgrades or replacement of ageing septic tank systems within the township.	Environmental Health Unit	EPA	High	Ongoing	Existing resources
	Where Council is notified of systems that are failing on existing restricted lots, work with owners to permit upgrades that provide improvements within the constraints of the property.	Environmental Health Unit	EPA	High	Ongoing	Existing resources
Monitoring and investigation	Implement ongoing sampling program of Thompson Creek and the Hendy Main Road stormwater infrastructure to ensure any potential contamination is monitored.	Environmental Health Unit	EPA	High	Quarterly	$10,000 per annum
	Investigate drainage infrastructure in older part of township and identify any improvements to alleviate storm water run-off issues.	Engineering Services	N/A	High	Commenced – 6 months	Existing resources

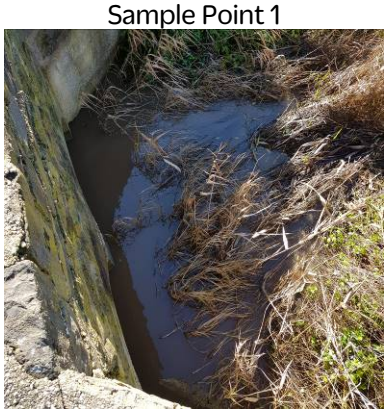
Strategy	Action	Lead	Supporting	Priority	Timeframe	Resources/ Funding
	Investigate the feasibility of a WSUD asset to be installed at the end of the Hendy Main Road Stormwater infrastructure to improve water quality prior to discharging to Thompson Creek.	Engineering Services	Environmental Sustainability	Medium	July 2022	$20,000
Maintenance	Update existing septic tank register and maintenance program for all Council owned septic tank systems.	Facilities Management Unit	Environmental Health Unit	High	Dec 2021	Existing resources
	Undertake maintenance along Hendy Main Road drainage infrastructure to minimise water pooling and surfacing over footpaths.	Engineering Services	Department of Transport	High	June 2022	Existing resources
Advocacy	Advocate to Barwon Water regarding this report and consideration of feasibility study into sewer, factoring in future developments and Moriac Structure Plan.	Environmental Health Unit	Barwon Water	Medium	Ongoing	Existing resources
	Advocate to RRV regarding potential upgrades to drainage infrastructure on Hendy Main Road and funding options.	Engineering Services	Regional Roads Victoria	Medium	Ongoing	Existing resources
	Advocate to property developers/owners to reinstate cross road culvert that was recently decommissioned.	Engineering Services	Regional Roads Victoria	High	Nov 2021	Existing resources

Appendix 1 - Photos of sampling sites collected on 12th August 2019

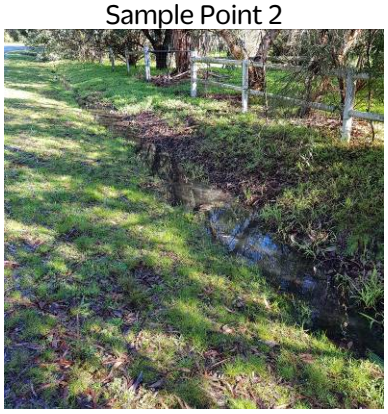
Sample Point 1

Sample Point 2

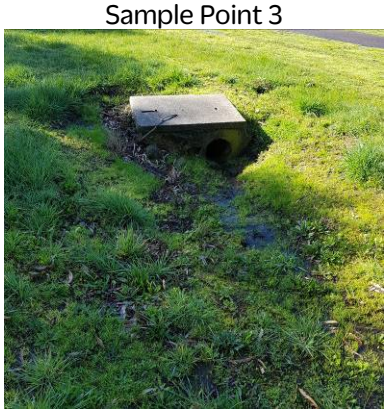
Sample Point 3



Sample Point 6



Sample Point 7

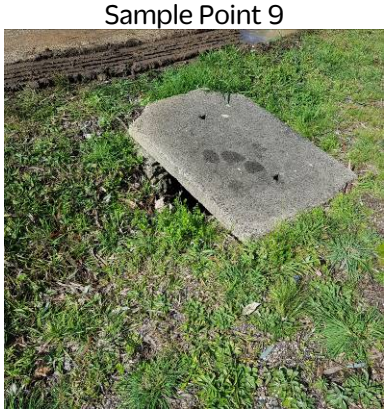


Sample Point 8

Sample Point 9

Sample Point 10

Sample Point 11



Sample Point 12

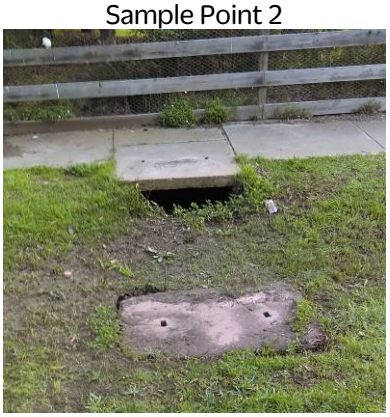
Appendix 2 - Photos of sampling sites collected on 4 September 2019

Sample Point 1

Sample Point 2

Sample Point 3

Sample Point 4



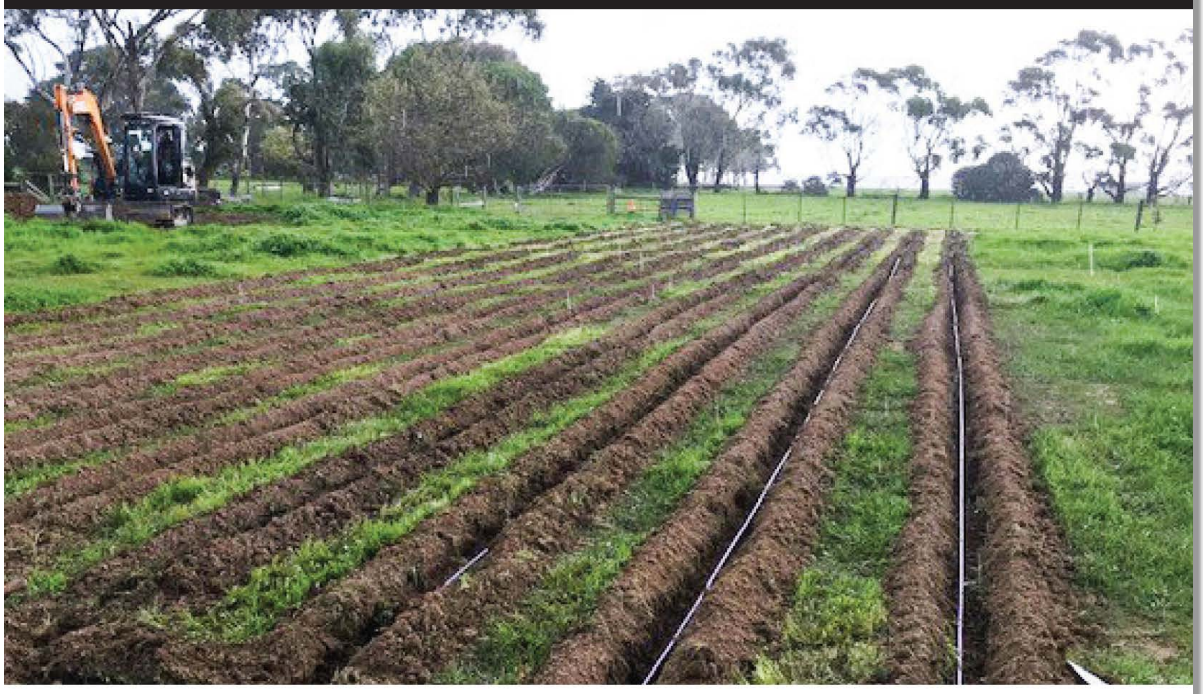
Sample Point 5

Sample Point 6

Appendix 3 - Community Information and FAQs (D19/131045)

Surf COAST SHIRE

COMMUNITY INFORMATION



Moriac Septic and Stormwater Study

Why are we doing this?

Surf Coast Shire Council is currently reviewing septic tanks and stormwater systems in Moriac.

We'll be seeking to understand how the systems operate and whether any pose a risk to the environment or to public health. We are aware there have been effluent leaks in the past so we are hoping to get an overall picture of the situation. We'll decide on future steps once the study results are known.

The Moriac Septic and Stormwater Study will include some inspections on private properties. We will also work with the Environment Protection Authority to test water at stormwater drains and pits and nearby waterways, including Thompsons Creek and Ravens Creek.

Property Inspections

Council officers will be requesting to undertake site inspections during October 2019. Council officers will contact property owners and occupiers directly if we need to request access to private property.

The inspections will take approximately 30 minutes and officers will only need access to the yard, not inside your house. Officers will be doing a visual inspection only and will not need to dig into the soil or open inspection pits.

You will receive a septic tank report, a site plan showing the location of the septic tank system (if found) and recommendations to help with the operation of your system.

If you would like your septic tank system inspected please contact us.

www.surfcoast.vic.gov.au

Background

All properties in Moriac rely on septic systems. The systems vary according to when they were installed with some dating from the 1950s. There have been examples in the town of effluent leaks into the street and into the stormwater system.

To operate a septic tank system you must have a permit from Council. All septic tank systems must be capable of treating wastewater in your own yard. All existing permit conditions will remain valid.

Property owners are responsible for ensuring that they continue to comply with permit conditions over the period of time they use a septic tank.

Failing septic tanks can cause environmental, public health and amenity risks. It's essential these risks are managed appropriately to protect the environment and human health.

Frequently Asked Questions (FAQs)

What if Council finds something wrong with my septic tank?

Council will provide advice to assist you to improve the operation of your system. If there is an immediate risk to public health e.g. off-site discharge of sewage where people could come into contact with, Council may ask you to fix the system within some reasonable timeframes.

How does my septic tank system work?

A septic tank system treats all of the wastewater generated from your dwelling and disposes or re-uses the treated wastewater onsite, with the intention to do so within your property.

What type of septic tank system do I have?

There are a number of different types of septic tank systems which have been installed in Moriac from the traditional septic tank and effluent disposal field, septic tank and sand filter to the mechanical treatment plants. We will help identify the type of system installed on your property during the inspections.

Why is it important to look after my septic tank system?

Septic tank systems require regular maintenance to work properly. Failing septic tanks can cause environmental, public health and amenity risks. If you don't manage your septic tank system well it can cost you a lot of money to replace or repair.

How can I look after my septic tank system?

Be careful what goes down the sink and toilet and get your septic tank de-sludged every 3 years or treatment plant serviced quarterly. Council will provide you further information as part of the study.

What if I don't want my property inspected?

Please contact us if you have any concerns about Council inspecting your property.

What if I rent my property out?

Council officers will contact you directly in the first instance, as the property owner. With your permission we can contact your rental agent or tenants to discuss this information and any concerns.

When will the property inspections happen?

We are proposing to conduct property inspections during October 2019.

SURF COAST SHIRE COUNCIL
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