

Case Study: The Importance of Adequate Development Compliance from an Asset Managers Perspective

S. Whitfield^{1*}, Y. Beavis² and A. Dreyer³

¹ Sunshine Coast Council

² Sunshine Coast Council

³ Sunshine Coast Council

* Corresponding author. Email: shannen.whitfield@sunshinecoast.qld.gov.au

ABSTRACT: Councils have a responsibility to ensure that development within their region is provided to an acceptable standard. In addition to the expected quality of service, development should also be socially sound, financially sustainable, and environmentally responsible. The majority of development work is assessed and approved under the Sustainable Planning Act 2009 by local governments. This provides a consistent and rigorous process, which ensures that the planning approvals meet community expectations.

This paper outlines a case study by Sunshine Coast Council's stormwater asset managers, and highlights the lessons learnt from investigating community concerns raised over a prior subdivision. These particular concerns had been ongoing since development handover and were investigated by various council officers over a number of years. By referencing the original development conditions set by council, it was possible to identify that there had been an issue with the compliance of those conditions, and ultimately the problems were able to be better understood and appropriate resolution actions undertaken.

Lessons learnt from this example include the significance of adequate record keeping, the importance of accurate as-constructed plans and asset hand-over processes, as well as the value in conducting a thorough review of archived development files. The case study also demonstrates that having appropriately trained officers, who have the skills and knowledge to be able to understand historical development conditions, can reduce community complaints and capital expenditure on unnecessary works.

KEYWORDS: council, development, community, Stormwater, compliance.

1 Introduction

The Sunshine Coast is one of the largest and fastest growing regional economies in Australia. Along with the ever-increasing population, is a need for accelerated development to provide suitable built infrastructure to meet the needs of the growing community. Sunshine Coast Council's Development Branch is assessing an increasing number of applications, and asset managers are subsequently receiving a greater number of contributed assets resulting from infrastructure agreements. With contributed council assets reaching an all-time high, asset managers at Sunshine Coast Council are stressing the importance of adequate planning and compliance of development sites to ensure the accuracy of as-built data and records to minimise the

number of subsequent post development remedial works.

Councils have a responsibility to ensure that development within their region is provided to an acceptable standard. In addition to the expected quality of service, development should also be socially sound, financially sustainable, and environmentally responsible. The majority of development work is assessed and approved under the Sustainable Planning Act 2009 by local governments. This provides a consistent and rigorous process, which is intended to ensure that the planning approvals meet both statutory and community expectations.

A high level of scrutiny is required for both the planning phase and overseeing the operational works to ensure the development is compliant with the local Planning Scheme and overarching Planning Act. Requirements and

specifications can vary significantly between regions and can be open to interpretation by the assessing officer. This can frequently lead to the completed built infrastructure being very different, and unfortunately usually of a lower standard, than what was envisaged at the time of planning approval. In addition to premature asset failure, the reduction in the projected level of service can also lead to community dissatisfaction, and in certain cases, neighbourhood disputes. The role of the development/compliance officer is therefore critical to ensure that comprehensive and accurate records are kept; compliance is completed to the prevailing standards; and variations are agreed by the respective asset custodian prior to completion of works.

Council's asset managers are dependent on the need for accurate, complete, and accessible asset data, in order to ensure continued delivery of that service to the community. It is imperative that this asset data is reliable for the conducting of both operational maintenance, and the future financial and renewal modelling which will need to be undertaken.

A number of important points were identified during the investigation, and these are detailed as lessons learnt further in this document. These also subsequently led to a number of process improvements being implemented in both the record keeping and data management areas, to ensure that future cases can be finalised sooner, and with greater confidence in a satisfactory outcome for the relevant asset managers.

2 Case Study

Council has a responsibility to investigate all enquiries, from maintenance to requests for increased infrastructure to mitigate flooding or potential damage caused during rainfall periods. This includes enquires about the adequacy of drainage as well as concerns about development compliance.

The case study outlined in this document is focused on a request from a Sunshine Coast property owner, who raised concerns with council about stormwater entering their property via their driveway, causing damage to their infrastructure. All names and property information have been excluded from this paper for privacy reasons.

2.1 Site Description

The property is situated on a mountain that is subject to rock subsurface, ground movement and ground water. The 53,310m² lot is heavily vegetated and located on the northern slopes of the mountain. The local street has a grade of 11.5% over 150m with a 90° bend that ends at a cul-de-sac. The property in question is located on the lowest side of the street with 93m of road reserve frontage. Figure 1 shows the location of the property in relation to the road and grade.



Figure 1: Locality (Sunshine Coast Council, 2018)

2.2 Situation

On December 9, 2017 approximately 60mm of rain fell over the area within an hour after the region experienced constant rainfall for several days, leaving grounds saturated. As a result, council received an above average number of enquiries relating to stormwater infrastructure within this suburb for the remaining month of December.

This customer contacted Sunshine Coast Council, requesting more stormwater infrastructure to be installed in their street to prevent stormwater entering their property during heavy downpours. They stated that the existing infrastructure was undersized and that they had tried to raise this concern with council previously.

As shown in Figure 2, there is little stormwater infrastructure located in the street; the council network consists of a single gully pit at the end of the cul-de-sac that connects to a 450mm dia. pipe, discharging into a pre-existing drainage line located within the customer's property. There is also a 1050mm dia. pipe

that conveys the overflow from an upstream pond that discharges into the same easement. There is also private inter-allotment drainage provided within easements throughout the surrounding properties that discharges into the customer's property through drainage easements. These private assets however, at the time of investigation, remained unidentified according to council's available mapping.



Figure 2: Stormwater network layout
(Sunshine Coast Council, 2018)

2.3 Investigation

When investigating customer requests relating to stormwater matters, council officers review a range of information that may be available. To determine whether there was an issue with the original design of the stormwater infrastructure, a site investigation was undertaken in addition to a desktop and development review.

2.3.1 Site Investigation

An engineering officer from council's Stormwater Services team met with the resident at their property. The site investigation was a crucial part in responding to the customers' enquiries to ensure that the true concern was identified. The aim of a site investigation is to gain a full understanding of the situation, determine the customer's primary concerns and identify if there are any contributing factors that may only be apparent by visual inspection. Several site visits were undertaken to grasp the situation, including two meetings with the residents, and easement inspections in surrounding properties.

During the initial visit, the main concerns identified by the customer included:

- Only one gully pit existed at the end of the cul-de-sac and no associated drainage pipes along 215m of the road.
- The customer believed that the road drainage was insufficient and was not designed properly as water overflowed from the road onto their property via their driveway.
- The customer is the grantor of a shared access driveway for three other properties. This is separate to their primary access driveway. They believed that the shared driveway had received substantial damage due to the rain events that had caused it to crack and deform.
- The inter-allotment drainage from the properties that had been subdivided previously connect to pits located on the shared access driveway, and these pits were blocked.

The following information was gathered by the engineering council officer during the various site visits:

- The customer's gravel driveway had been washed out and had minimal freeboard, indicating that it was substandard for a residential driveway.
- The road profile did not allow water to take the 90° bend, causing water to travel down the customer's driveway in the eastern corner of their property.
- Once the gully pit at the end of the cul-de-sac reaches capacity, water would pool in this location until it could overflow the top of kerb and pit, into the drainage easement.
- The field inlet pits for the downpipes were blocked, however the maintenance of downpipes is the responsibility of the respective property owner/s in which the drainage benefits.
- There were current works underway to replace the council inlet grate associated with the 1050mm pipe from the pond. The previous grate design blocked frequently due to the heavily vegetated area, causing water to overflow the top of this and travel overland through private properties. The new grate design aimed to reduce the blockage frequency and improve accessibility for future maintenance.
- No inter-allotment drainage system was identified in one of the subdivided

properties. This raised a question of the drainage easement intent over this property.

2.3.2 Development Review

The site investigation led to the following questions that required review of the original development documentation.

1. What was the original design of the stormwater infrastructure?
2. Were the original as-constructed plans an accurate representation of what was in place?

Sunshine Coast Council stores all development files either in electronic or hard copy format. In this case, the original development documentation and all relating correspondence, appeals, decision notices and as-constructed plans were made available in hardcopy.

After reviewing the archive development documentation, the following was concluded:

- The portion of the council owned road was extended in 1996 when the original property subdivided. Figure 3 is an excerpt from the original archive file that displays the relevant civil works associated with the subdivision.

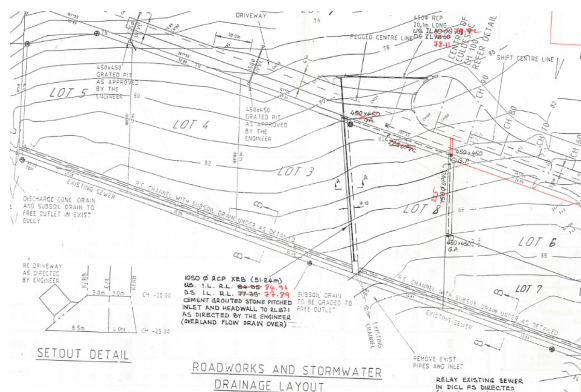


Figure 3: Excerpt from development archive file - civil works

- The original developer of the road extension and subdivision was the current customer who was insisting the road drainage was undersized. This meant that the original developer, and in this case the current customer, was responsible for the design of the stormwater drainage located in the street that is now of their concern.

- The survey plan from the development, identified that there was previously a natural gully in the location that the stormwater is currently flowing down the customers' driveway (shown in Figure 4). At the time of development, the recorded correspondence showed that council conditioned this area to contain a stormwater easement, however this decision was appealed by the developer. The appeal was granted under the condition that should the property owner/customer experience any stormwater issues in future, an easement would be granted in favour of council at the expense of the property owner.

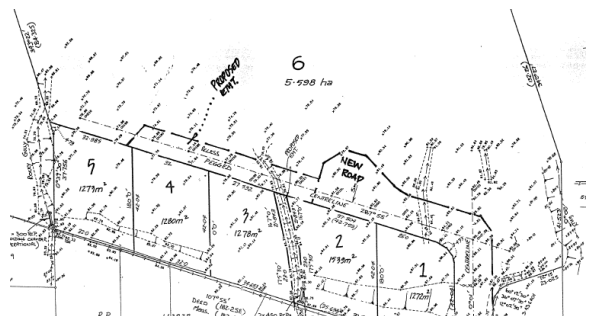


Figure 4: Excerpt from development archive file - original proposed layout for subdivision that demonstrates the existing drainage lines

- The private access driveway at the end of the western cul-de-sac that services three other properties did not appear to be constructed as per the as-constructed plans that reference the slab as being reinforced concrete (shown in Figure 5). There is significant cracking to the concrete driveway that appears to have been an issue since 1998 according to previous complaints from neighbouring properties shortly after construction. Furthermore, upon recent visual inspection, the driveway did not show signs of steel reinforcing as per the detail on the next page.

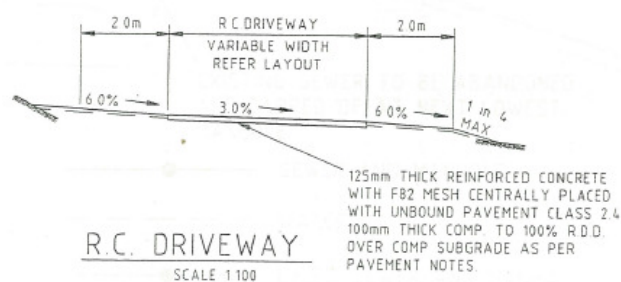


Figure 5: Excerpt from development archive file (as-constructed drawings) - reinforced concrete driveway detail

- The as-constructed plans indicated that there was a concrete v-drain (Figure 6) constructed in the back of lots 5, 4 and 3 to protect those properties from overland flow. Although this was detailed in the plans, the recent easement inspection undertaken by council officers did not reveal any existence of a concrete v-drain. Instead, Lots 4 and 5 contained an underground PVC pipe and Lot 3 did not contain any drainage infrastructure.

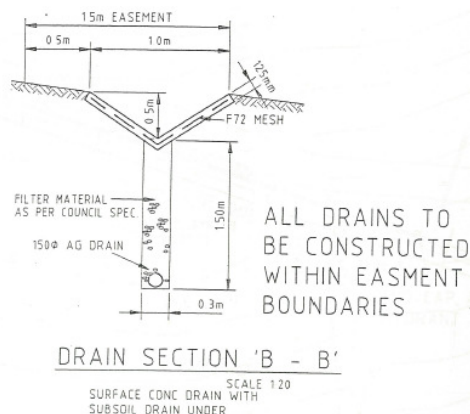


Figure 6: Excerpt from development archive file (as-constructed drawings)

2.3.3 Desktop Analysis

The objective of the desktop analysis was to find further information to support what was uncovered on site and through development documentation. This section details the various avenues adopted in this case for the retrieval of information, however it is worth noting that many other possible avenues may exist in addition to those outlined below.

Historical enquiries

Sunshine Coast Council's customer request system stores information and correspondence relating to complaints, enquiries, compliance issues and development and building applications. The following previous enquiries about this development were retrieved from the system:

- The same customer raised a similar request in 2015, requesting for council to install additional drainage infrastructure in the street. As a result, council completed some minor upgrade works including upgrading the gully pit at the cul-de-sac to IPWEA standard.
- Several complaints were recorded from the adjacent neighbouring property (Lot 3 from Figure 4) regarding flooding of their property as a result from overland flow from above.

Applications against property

It was determined that the property had a current application permit to Reconfigure a Lot. This was submitted to council in 2015, to subdivide the property into a further 7 lots. The associated decision notice by council conditioned the developers, in this case the customer, to install adequate drainage to cater for the street and to replace the shared access driveway that is in poor condition. Both are what the customer requested Sunshine Coast Council to complete following the 2017 storm event.

Rain data

Sunshine Coast Council have rain gauges throughout the region that feeds data to a live database with a system portal known as TARDIS. This system provides an estimation of what frequency storm was experienced for the broader catchment. In this case, a storm exceeding a 10 year ARI was experienced (Figure 7). It is expected that a storm of this size exceeds that of what underground drainage is designed to cater for.

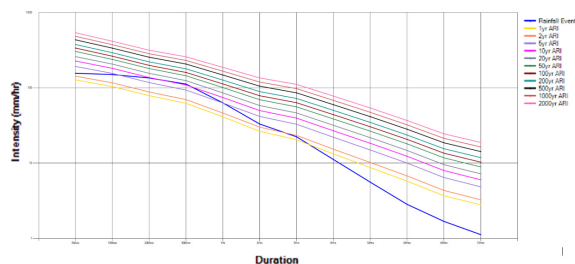


Figure 7: TARDIS rainfall station Intensity Frequency Duration (IFD) chart

Aerial imagery

Sunshine Coast Council store historical imagery retrieved from previous flyovers that date back to 1958. Historical aerial imagery was reviewed to determine if the concrete v-drain was ever in place in the back of the subdivided properties; the aerial image from 2000 showed a swale, but no presence of a concrete v-drain (Figure 8)

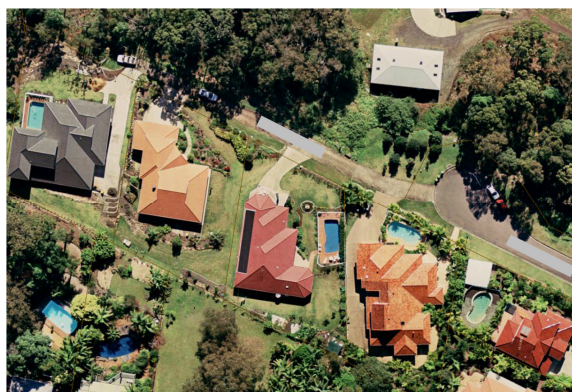


Figure 8: Sunshine Coast Council 2000 aerial image (Sunshine Coast Council, 2018)

Street view

Street view images were able to provide detail on the condition of the driveway in years prior to the 2017 storm event. An extract of the 2014 condition is illustrated on the following page (Figure 9). It is evident that the driveway did not meet the engineering guidelines for a residential driveway (IPWEA Standard Drawing RS-049 and RS-050); the height of the driveway above the invert of channel did not reach the recommended 250mm and was constructed with loose gravel material.



Figure 9: Google Street view image of customer's driveway (Google Maps, 2018)

Previous works

Council has undertaken the following works previously:

- Upgrade of the gully pit at the cul-de-sac to a new standard IPWEA asset to assist with inlet capacity in 2015. This was in response to the customer enquiry.
- Completed capital upgrades to the inlet grate from the pond to reduce blockage and the frequency of overflow in early 2018.
- Extended kerb and channel along the upper portion of the street in 2015.

2.4 Outcome

The combination of site investigations, reviewing development documentation and a thorough desktop review allowed council to determine a resolution to the customer enquiry.

The development documentation and compliance determined that the customer was in fact the original developer who was responsible for the design of the stormwater infrastructure. It was identified by council at the time of development that the eastern portion of their frontage would experience overland flow and that a drainage easement would be appropriate over this area. However, the developer contested this decision and it was removed with a condition should they ever experience issues in the future, an easement would be donated to council.

In response to the request for further stormwater infrastructure to be installed in the street, council advised the customer of the

outcome of the investigation and that council would not be upgrading the stormwater drainage at this stage. However, should the customer continue to have concerns of water flowing through the eastern portion of their property, they have the opportunity to donate a drainage easement in favour of council.

It is recognised that underground infrastructure is difficult to inspect by council development compliance officers, particularly in 1996. However, visual discrepancies were evident between that of the as-constructed plans and what was actually constructed on site. This is particularly made evident by the lack of concrete v-drain in the subdivided properties, and the shared access driveway not containing reinforcing. To rectify this, council has since undertaken works to comply with the initial design, including a swale and concrete invert. The access driveway without reinforcing is an asset of the property owner, which in this case is the customer. Therefore the owner is responsible for the maintenance of the driveway and council did not contribute towards any rectification works for this. Should any of these discrepancies been picked up during the compliance stage, the issue could have been rectified by the developer, not at the expense of council or the community.

Although council contributed funds to rectify some of the shortfalls in the development compliance, by reviewing the original development documentation, council officers were able to determine the underlying concern in the area; the original developers were aware of the drainage characteristics of the site and possibly had a hidden agenda for requesting council to upgrade the stormwater drainage to address their current development application conditions specified by a different branch of council.

3 Conclusion

In an ideal asset management world, officers would be responsible for the management and maintenance of contributed infrastructure that has undergone a high level of scrutiny in both the planning phase and operational works to ensure all assets comply with prevailing standards. Unfortunately, due to the occasional limit of resource allocations and restrictive development assessment timeframes, infrastructure oversights can become prevalent.

3.1 Importance of Development Compliance in this Case

This case study draws attention to the following key methods for improved development compliance to reduce the number of community complaints resulting from reasonable new developed areas, as well as the reduction in capital expenditure on unnecessary works.

- Identify cohesion between as-built data and what was precisely constructed on site.
- Make an allowance for adequate planning and for decisions to be accurately recorded and archived for future use.
- Create opportunity for upskilling officers involved in development compliance/auditing. Creating a workforce with appropriately trained officers who have the skills, knowledge and qualifications to apply engineering judgement.
- Ensure adequate levels of resources and time are committed to planning and compliance in development. This will see an enhanced quality of life for Queensland communities through the endorsement of adequate civil infrastructure.

3.2 Lessons Learnt

The success of an asset manager's investigation into post development contributed infrastructure is reliant on the following:

- Don't underestimate the worth of an officer channelling their inner 'forensic analyst' and refrain from being short-sighted when approaching an investigation. A thorough examination into a site's history can easily be avoided by investigating officers, with a stigma of being too time consuming. This approach however lacks foresight. The early provision for time can see raised community concerns closed out in a timely manner as well as unnecessary expenditure towards uninformed quick fix solutions completely avoided. It is best for asset managers to circumvent temporary solutions that do not deal with or mitigate the underlying real issues at hand.
- When dealing with expressed concerns of inadequate public infrastructure by the community, don't make any default assumptions. Approach with an open mind

and don't rule out all possible circumstances. It may even be of value to ask yourself the question "*Is the problem at hand in fact councils to resolve?*". The case study outlined in this document demonstrates how useful background research and scrutiny of original development information can be in answering this question.

- Cultivate good habits by seeking to employ and/or develop asset managers with the appropriate level of knowledge and skills to not only manage assets but to also apply other specialist skills i.e. in this case an understanding of stormwater hydraulics and an appreciation of development processes so archived information could be retrieved and analysed to a satisfactory level.
- By having an awareness of the development process, asset managers can understand why decisions were made, what was involved, what were the prevailing design standards, as well as what historical complaints or enquiries were made during the development process? Successful engineering judgement will then prevail.
- Ensure details regarding the process and findings of an investigation are adequately stored in council's record keeping system and linked to properties were applicable. At Sunshine Coast Council the attribute data for the stormwater assets in the mapping system are periodically updated with application or drawing number references to proof retrieval of archive information by others in future.
- Stormwater asset managers should utilise all available avenues to recruit the necessary information to make an informed decision. This includes but is not limited to the avenues listed under Section 2.3.3 Desktop analysis.

3.3 Key Areas for Improvement

Sunshine Coast Council stormwater asset managers have identified the following areas for future improvement:

- Closing the gap in the handover process of contributed assets between the development team and asset managers.
- Improve on Asset Design and As Constructed (ADAC) processes so the

available mapping matches the as-built plans. This will possibly save time and/or eliminate the need to find and review original development information.

- Consider the creation of an incident register. This will become a single point of truth for asset managers to either refer to or check for follow-up actions/conclusions.

In conclusion, this case study exemplifies one of the more successful stories for Sunshine Coast Council's stormwater asset managers, however the information that was obtained during this case may not always be what is readily available in all situations. Should council's commit to a greater level of resource allocation and support for adequate development compliance in future, and asset managers make provisions for time early in their investigation to gain a complete history of the real infrastructure concerns then council's will see future cases finalised in an expedient manner, and with greater confidence in a satisfactory outcome for the community.

References

1. Google Maps. (2018). Google Maps. Viewed 19 September 2018.
<<https://www.google.com.au/maps>>
2. Sunshine Coast Council. (2018). Sunshine Coast Mapping – MyMaps. Viewed 19 September 2018.
<<http://maps.sunshinecoast.qld.gov.au/maplet/?config=config/mymaps/myplace/undergroundservices.xml>>