

KELLEY COVEY
GROUP PTY LTD
Consulting Engineers



DETAILED SEWER SERVICING STRATEGY
FOR
PROPOSED COMMERCIAL/INDUSTRIAL DEVELOPMENT
AT
LOTS 2 & 3 IN DP1234850, 55 DAMPIER STREET, TAMINDA NSW
FOR
ELTON CONSULTING PTY LTD

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Checked: Matthew Ferris

BEng, AdDipMgt



Approved: Justin Cant

BEng, CPEng, MIEAust, NPER, RPEQ(15162)

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1. Introduction

This Sewer Servicing Strategy Report has been prepared by Kelley Covey Group for Elton Consulting Pty Ltd to accompany a planning proposal and future development application for the rezoning of Lots 2 & 3 in DP1234850, part 55 Dampier Street, Taminda. It is proposed to re-zone the site to a mix of IN1 – General Industrial and B5 – Business Development zones to facilitate development of a commercial/industrial business park at the site. The site is currently zoned RU4 – Primary Production Small Lots as per the *Tamworth Regional Local Environment Plan, 2010 (TRLEP)*.

This report has been prepared in response to a Tamworth Regional Council resolution (Resolution 373/19, TRC Ordinary Council Meeting, 22 October 2019) that requires and acceptable sewer servicing strategy be prepared prior to public exhibition of the gateway determination, a critical stage in the planning proposal approval process.

The purpose of this report is to provide a detailed and robust feasibility determination for providing sewer servicing to the site and proposed development. This report demonstrates that a feasible and practical sewer strategy for the site is available, with the final details of the strategy determined at DA and CC stage when detailed design can be undertaken.

This report has been prepared in accordance with *Schedule 1 of the Environmental Planning and Assessment Regulation, 2000*, the *Tamworth Regional Development Control Plan, 2010 (TRDCP)* and the *Tamworth Regional Engineering Minimum Standards for Subdivisions and Developments*. Within this report, references to “the site” means Lot 2 & 3 in DP1234850 to which this servicing strategy relates, “the parcel” refers to the Consolidated Chan Abbey Holdings Pty Ltd Lands (described herein) and “Council” refers to Tamworth Regional Council.

2. Description of the Property

2.1. Site Details

- Property Description: Lot 2 & 3 in DP 1234850
Locality of Taminda
Parish of Murroon
County of Parry
- Property Address: 55 Dampier Street, Taminda NSW.
- Registered Owner: Chan Abbey Holdings
- Applicant: Elton Consulting Pty Ltd
- Local Authority: Tamworth Regional Council
- Total Site Area: 11.34ha
- Zoning: RU4 – Primary Production Small Lots, Minimum Lot Size: 40ha;

2.2. Property Description

The subject property is located on the north-eastern fringe of the Taminda industrial area, approximately 3km west of the Tamworth city centre. The site consists of two lots; Lot 2 on the western side has road frontage to Wallamore Road, whilst Lot 3 on the eastern side has frontage to Dampier Street. The lots are bisected adjacent to their northern boundary by a 40m road reserve for future road construction. The lots are part of a larger parcel of land, known as the Consolidated Chan Abbey Holdings Lands Pty Ltd (the parcel), that also includes Lot 1 in DP 1234850 and Lot 60 in DP1227482, also known as Somerset Farm. For the purpose of this servicing strategy, only Lots 2 & 3 are to be considered, with a total developable area of 8.98ha.

Along the southern boundary of the site are existing small lot light-industrial developments, to the east is the Tamworth Lawn Cemetery (with expansion currently under construction), and to the north and west of the site the land is used for agriculture, in particular irrigated feed crops and some stock grazing.

The site is located within the Wallamore Anabranch flood plain of the Peel River system, and is within the Flood Planning Area as defined in the TRLEP. The site is considered reasonably flat, with a slight grade north towards the Peel River. The natural topography ranges from RL372 to RL373.

The site is virtually undeveloped, with a history of mixed use farming including crop production and stock grazing. In the south-east corner of the site, an area of approximately 6,500m² is currently being used for the storage of miscellaneous items including shipping containers, small transportable buildings and temporary ablutions blocks.

An existing 6m wide easement for the drainage of sewer traverses the site diagonally from the south eastern corner to the north-western corner. The easement contains a 900mm diameter trunk sewer main that conveys flows from a large catchment including South Tamworth, West Tamworth and Taminda and eventually discharges to the Westdale Wastewater Treatment Plant located approximately 2.7km to the west.

There is also a 5m easement to drain water the traverses the site north to south along the eastern boundary of Lot 2. A 450mm diameter RCP discharges via a headwall to a channel formed within the easement. A 150mm diameter sewer line is also constructed within this easement, and discharges into the 900mm trunk main.

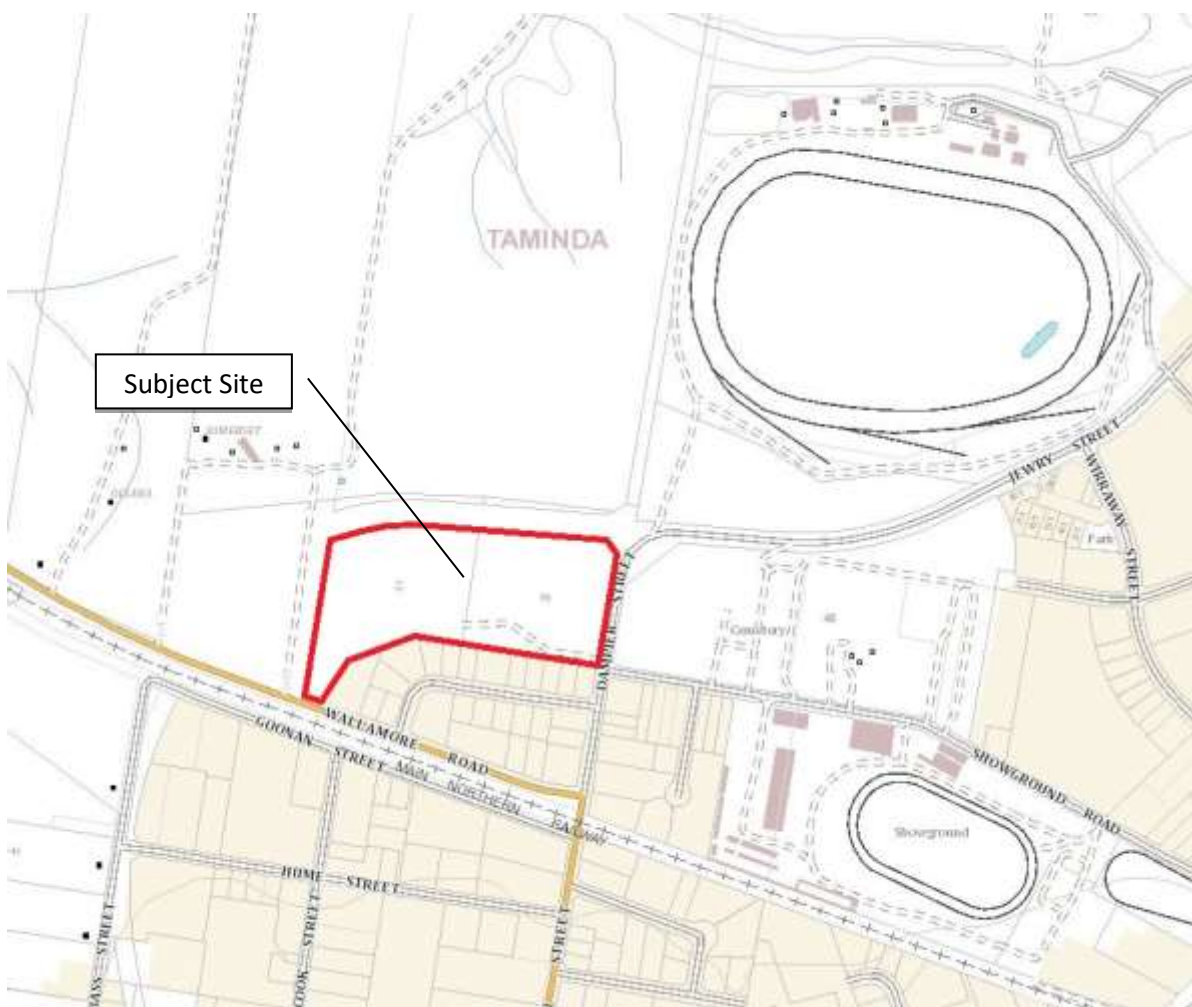


Plate 1. Site Location Plan (Source: SIX Maps, retrieved 12 August 2019)



Plate 2. Aerial Photo of Site (Source: NearMaps, retrieved 12 August 2019)

3. Existing Services and Utilities

The site benefits from a water service connection from the existing DN100 DICL main located on the northern side of the Wallamore Road reserve. There is sewer infrastructure available to provide connection to the site but it is believed that the site is not currently connected to sewer.

The site drains as sheet flow north to the Peel River, and the 450mm diameter RCP and headwall located in the drainage easement at the southern boundary of the site discharges runoff from the upstream developed area to the south of the site in Kingsford Smith Street. A stormwater pipe also discharges at the south-eastern boundary of the site in Dampier Street to existing open channels located within the road reserve. There is minimal stormwater drainage infrastructure in Wallamore Road, and flows from the road reserve discharge through roughly formed open swales to a natural watercourse and causeway west of the site, which forms part of the Timbumburi Creek floodplain.

There is overhead electrical power in both Wallamore Road and Dampier Street as well as underground telecommunications and natural gas connections. The site is within the NBN-ready area of Tamworth.

4. Proposed Development

It is proposed to re-zone part of the site from RU4 – Primary Production Small Lots to a mix of IN1 – General Industrial and B5 – Business Development, with the long term objective to develop part of the site as a mixed use commercial/industrial business park consisting of up to 41 Business Development sites and 14 General Industrial sites, as well as internal roads, car parking and landscaped areas. The potential site layout consists of a main road intersecting with Dampier Street, with other minor roads branching off this connection. Connectivity to the proposed Jewry Street ring road connection will not be provided, as per advice received from Tamworth Regional Council.

The industrial sites will generally occupy the southern half of the site, with the business development sites to occupy the remaining northern half of the site approximately east of the existing sewer easement. The final layout for the proposed development is still to be finalised, and the mixture of business types that may occupy the site is presently at a very preliminary stage, however the following areas are considered a reasonable estimation of the proposed land use for the site (as taken from the TRLEP permitted uses for land use tables);

- B5 – Business Development; 1.55ha Gross Floor Area (GFA). Potential business types could include, but not to be limited to, the following;
Centre-based child care facilities; Garden centres; Hardware and building supplies; Landscaping material supplies; Light industries; Liquid fuel depots; Oyster aquaculture; Passenger transport facilities; Respite day care centres; Self-storage units; Shop top housing; Specialised retail premises; Tank-based aquaculture; Warehouse or distribution centres;
- IN1 – General Industrial; 3.55ha Gross Floor Area (GFA). Potential business types could include, but not to be limited to, the following;
*Depots; Freight transport facilities; Garden centres; General industries (**general industry** means a building or place (other than a heavy industry or light industry) that is used to carry out an industrial activity); Hardware and building supplies; Industrial training facilities; Landscaping material supplies; Light industries; Liquid fuel depots; Neighbourhood shops; Oyster aquaculture; Places of public worship; Plant nurseries; Rural supplies; Shop top housing; Take away food and drink premises; Tank-based aquaculture; Timber yards; Vehicle sales or hire premises; Warehouse or distribution centres;*

Despite the flexibility in land uses permissible under the TRLEP, our understanding is that the development is to include low-impact, low scale commercial and light industrial/storage businesses.

The legal framework defining the development and individual sites (ie. Torrens Title lots, Strata Title or Community Title) is yet to be determined and will be decided following rezoning and consultation between the owners, potential purchasers and Council as part of future development applications for the site. For the purposes of this strategy, the legal framework of the development is not considered critical.

5. Site Servicing

Strategies for stormwater drainage, electrical and telecommunications utilities, road and pedestrian access and traffic management have been prepared separately and are not included in this report. Each of the utilities will comply with the design requirements of Council's *Engineering Guidelines for Subdivisions and Developments* (the Guidelines) and the *Tamworth Regional Development Control Plan, 2010 (DCP)*.

6. Background and Previous Investigations/Strategies

Previous site investigations have explored a range of potential sewer servicing options for the site, which is complicated by the following;

1. The site is located within the Peel River Floodplain, and local topography and existing infrastructure locations and depths prevent the adoption of a traditional gravity sewer system to discharge to the existing network.
2. An existing 900mm sewer trunk main that traverses the site has capacity issues during wet weather and is unable to receive any additional flows during storm events;
3. The existing 900mm trunk main is relatively shallow, and is unable to service the footprint of the proposed development with current topography and site levels;
4. The composition of occupancy and tenancy of the development is unknown, as is any potential staging and the ultimate development layout.

7. Stakeholder Liaison

Extensive consultation with Tamworth Regional Council has been undertaken, including formal and informal meetings, e-mail and telephone correspondence, and submission/review of potential servicing solutions. The following is a brief summary of the outcome of that liaison;

- The upgrade of the existing Plain Street Pump Station, which will alleviate the capacity issues in the existing 900mm trunk main, is being planned and designed, however a completion date has not been set and could be up to four (4) years away;
- The upgrade will consist of a duplicated pump station and rising main to be activated during wet weather to provide additional capacity during storm events.
- This type of upgrade will potentially benefit the development site, as capacity constraints are only relevant during wet weather;
- A conventional pump station providing the long-term servicing solution for the site will not be permitted.
- The only sewer servicing solution deemed acceptable to Council is for the site to be designed to ultimately allow for gravity feed to the existing 900mm trunk main, with a short-term pumping station and timed-discharge system to the existing sewer main provided until the Plain Street Pump Station upgrade is complete and the wet weather capacity constraint is removed.
- This solution will require the inclusion of detention storage to receive and store site generated flows for a period of up to **72 hours** during a rainfall event until flow capacity is restored and the stored flows can be pumped to the existing network.
- The provision of odour control measures, well washers and potentially carbon filters to prevent septicity will be required in the pump station design due to the extended detention times;
- Staging of detention storages aligned to development staging will be permissible. That is, multiple detention storage tanks connected in series will be permissible and can be incorporated into a future design if required, rather than a single, large detention storage unit.
- The pump station system will not be required to integrate with Council's SCADA (telemetry-based) data control system, however some provision should be made to provide Council with performance and alarm status information through standard monitoring systems installed at the time of commissioning.
- A conservative approach for the calculation of EP's (Equivalent Populations) to determine the required design flows and detention storage volumes should be taken in the absence of specific development use information.
- To assist with design calculations, Council will install Multitrode flow meters on the existing 900mm sewer main to determine existing flow conditions in both dry and wet weather.
- Council will not take ownership or operational control of a proposed pump station system, and as such any pump station infrastructure is to be managed and maintained by future private entities.
- A preliminary design for the extension of Jewry Street to Wallamore Road was provided informally, and is currently being designed as part of the Tamworth Global Gateway Park and Intermodal Hub projects. The formation of the road extension will be similar in height and geometry to that of the Taminda Levee, consisting of a four-lane road constructed on top of a flood mitigation levee. Preliminary design levels indicate that the top of the kerb level of the road is generally equal to the 100 year ARI flood event.

8. Consideration of Alternative Solutions

The servicing option Council have deemed acceptable is a conventional gravity fed system discharging to the existing sewer main in the long-term, whilst in the short-term discharging to a pump station with additional delayed detention storage capacity, which is to be operational until the Plain Street Pump Station upgrade is complete and the wet weather capacity constraint is removed.

Several alternative servicing solutions have been developed and proposed to Council, however they will not be described in any detail as part of this report.

9. Evaluation of Design Components for Gravity Fed Strategy

9.1. Site Filling

The discharge point(s) for any proposed network is the existing DN900mm line that traverses the site, and specifically any one of three existing manholes located on that line that are located within the site boundaries. To achieve a gravity fed system, the site will need to be filled to provide sufficient depth of cover to allow a pipe network to grade from any location on the site to one of the three existing manholes.

The proposed gravity network would need to comply with minimum design criteria as described below (as per TRC Minimum Standards);

- Connection to the existing 900mm sewer main is to be obvert-obvert plus 50mm as per WSA and TRC Guidelines. That is, the obvert of the proposed sewer main (likely DN150) is to be 50mm higher than the obvert of the receiving DN900 main);
- DN150 pipework was considered for the internal network;
- Minimum grades as per TRC Design Minimum Standards, Part 5, Table D (estimated from site layout and between 1.0 – 1.25%);
- Minimum Cover to the invert of sewer in roadways to be 750mm;
- Soffit Requirement as per the NSW Code of Practice for House Drains is observed;
- Manhole placement and fall through manholes to comply with TRC Minimum Standards;

Irrespective of the sewer strategy adopted, the site is required to be filled to a minimum height equal to the Flood Planning Level (Q100 year flood plus 0.5m) to satisfy flood protection requirements.

Crossing the existing DN900 pipe will potentially be difficult due to the size of the pipe and the low depth of existing cover to the natural surface, and so the servicing strategy will need to minimise the number of crossing required.

A calculation of the expected amount of site filling required to allow for a gravity fed (ultimate) servicing solution has been completed using the following procedure;

1. A grid of twenty (20) nodes was placed across the site, representing potential locations to be serviced by a gravity sewer. The location of each of the nodes was chosen to evaluate the potential for discharge to either of the three existing manholes, whilst providing varying distances and geometric constraints (such as proximity to the existing DN900 main and potential crossing constraints);
2. A concept network alignment, based on using parallel/perpendicular road corridors as alignment pathways rather than straight-line distances from the receiving manholes, was developed to connect each node to the three receiving manholes, and the length of each alignment was calculated;
3. The required depth of fill was calculated using a conservative 1.25% grade (the maximum grade required for a sewer line as per TRC Minimum Standards), and allowing for the following;
 - a. An invert – obvert-plus-50mm relationship from the incoming sewer line to the existing DN900;

- b. An additional 100mm clearance between the incoming sewer and the obvert of the DN900 was added to allow for connection details and tolerances;
 - c. A minimum 900mm cover from the invert of the sewer line at the upstream node to the filled surface level;
4. The alignment to the receiving manhole that required the least amount of fill was adopted as the preferred connection point for each node;
5. Batters of 1 in 5 (V:H) were adopted to transition from the natural surface around the boundary of the site to the filled surface level. The toe of the fill batter is generally equal to the site boundary;
6. The alignment and height of the proposed Jewry Street extension was added to the filled surface to enable examination of the interface of the road surface and the filled site. Design information for the road was provided by Tamworth Regional Council (Ref: SK1098-001) and is included in Appendix A;

A schematic diagram detailing the above design criteria is shown in Figure 1 below, and a plan showing the indicative fill levels required to service the site is included in Appendix B;

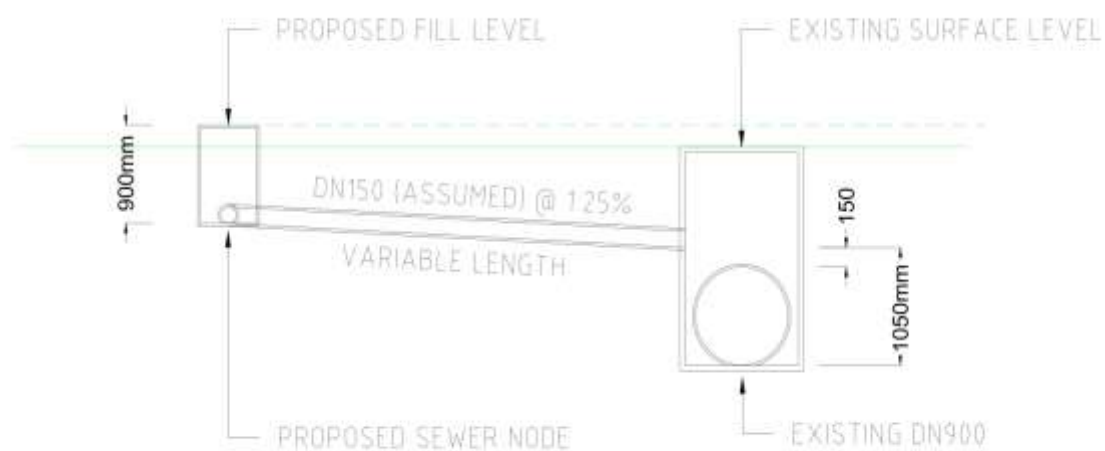


Figure 1 – Gravity Sewer Node Depth Calculation Schematic

9.2. Sewer Pump Station

Preliminary calculation of design inputs for a sewer pump station to service the fully developed site have been prepared in accordance with WSA-04-2005 Sewer Pumping Code of Australia, and using design flows estimated from the land-use described in Section 4 and Appendix B of WSA-02 2014 – Gravity Sewer Code.

A conservative methodology for estimating Equivalent Population has been taken by adopting values from WSA-02 Table A1 for “General Commercial” and “Future Industrial” land use types, and using the lot areas provided in the site layout masterplan.

Detailed design information is included in Appendix C, and a brief summary is included below;

EP:	649
ADWF:	1.36 litres/second
PDWF:	5.8 litres/second
GWI:	0.156 litres/second
IIF:	5.69 litres/second
Design Flow:	11.6 litres/second
Emergency Storage Required:	19.63m³ (4 hours ADWF flow)

9.3. Short-term Pump Station and Off-Line Storage

In the short-term, and until the Plain Street Pump Station upgrade is complete, the gravity network will need to discharge to a sewer pump station coupled with a timed-discharge off-line storage system. In the context of the adoption of a gravity fed network being adopted as the long term strategy, the following was considered in terms of the pump station system;

- The advantages and disadvantages of a single pump station versus multiple pump stations (one at each receiving manhole) were considered, and it was determined that (provided connectivity was possible) a single pump station arrangement should be adopted;
- Potential locations for the temporary pump station and off-line storage tanks were investigated and an ideal location was determined to be on the northern side of the existing DN900, approximately 10m offset from the central existing manhole (MH-2). This location has the advantage of being centrally located between the three receiving manholes – thereby minimising the grades required for connection pipelines, and it is located sufficient distance away from the existing DN900 so as not to pose a risk to that pipe during excavation and construction.
- The pump station will discharge to the existing DN900 at the manhole centrally located on the site;

To provide for the short-term connection between the proposed gravity network and the temporary pump station/off-line storage, the following methodology was adopted;

- New receiving manholes are to be constructed adjacent to each of the three existing receiving manholes, one each on the northern and southern side of the existing DN900;
- The gravity network is to be designed to discharge to these manholes, rather than the existing manholes;
- In the short-term, these manholes will discharge to temporary sewer lines, one each on the northern and southern side and parallel to the existing DN900, that will direct flows to the temporary pump station;
- A line crossing beneath the existing DN900 approximately adjacent to the existing central receiving manhole will connect the temporary sewer lines from the southern side of the DN900 to the pump station on the northern side;
- The depth of the pump station will be determined by the invert levels of these temporary sewer lines;
- Upon completion of the Plain Street Pump Station upgrade, the temporary sewer lines and pump station/off-line storages will be de-commissioned, and the discharges from the new receiving manholes will be re-directed to the existing adjacent manholes, thereby completing the gravity fed network;

A schematic detail showing the proposed short and long-term connection details is shown in Figure 2 below;

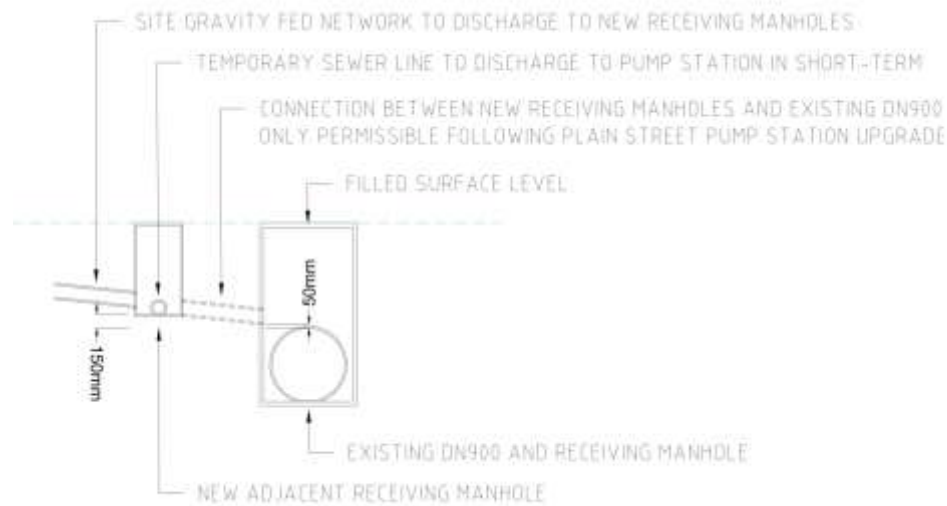


Figure 2 – Gravity Sewer Node Depth Calculation Schematic

In addition to the emergency storage requirements of WSA-04 (which allow for pump or power failure), flows into the pump station system are required to be detained during periods of wet weather and their discharge into the existing gravity network delayed until sufficient capacity is restored in the downstream main. Council have indicated that the detention storage component of the system should be designed *“To accept flows from the fully developed site and store them for up to 72 hours prior to discharge to the existing gravity sewer network”*.

An estimate of required detention volumes for various timeframes has been prepared as follows, based on an extension of the Design Flow that accounts for wet weather effects;

12 hours, fully developed site:	500,000 litres
24 hours, fully developed site:	1,000,000 litres
48 hours, fully developed site:	2,000,000 litres
72 hours, fully developed site:	3,000,000 litres

The storage of flows for up to 72 hours is very conservative and not a common design criteria, and prior to the formal adoption of a specific detention time, the behaviour of flows and available capacity in the existing receiving sewer main during periods of both dry weather and rainfall events should be determined. The placement of flow meters on the existing sewer and modelling of the contributing catchment will allow appropriate detention time to be nominated. *It is noted that at the meeting of 5 February 2020 Council indicated that flow meters would be placed on the existing sewer main to commence this process, but no data was available at the time of writing.*

The detention storage system should be designed to be scalable and flexible; comprising multiple, modular style tanks connected in series that are sized to match the storage requirements for each development stage, rather than a single large tank.

Storage of sewerage for periods of time exceeding a few hours can lead to septicity and the production of hydrogen sulphide gas, and therefore the inclusion of pre-treatment and/or odour control elements including carbon filtration and ozone treatment should be considered in the design of the detention storage system (as well as the pump station itself). Similarly, the system should include well washers to reduce the impact of extended storage times on the longevity of infrastructure elements and to reduce the likelihood of bacteria growth and hydrogen sulphide H₂S production.

Regarding odour control and pre-treatment, Council have advised the following;

“Following wet weather events it would be realistic to assume the tail out flows within the trunk main would still be high, and the amount able to be discharged from the proposed pump station relatively small in comparison. In terms of dosing for TRC this may not be required (however this would ultimately relate to proposed detention

times). Nonetheless adequate odour control would be a requirement at the proposed pumping station.”

Therefore, any pump station and detention storage design should include odour and septicity control measures, but not chemical dosing unless conventional and less expensive measures are not considered appropriate at the time of design or commissioning.

9.4. Vehicular Access

Fill batters of 1:5 (H:V) were adopted to transition from the existing natural surface at the site boundary to the required fill level. The width of these batters varies with the different fill requirements around the perimeter. As these batters are too steep to allow compliant vehicular access (as per AS2890.1), further investigation of potential site access is required.

It is assumed that the site will be accessed in two locations; along the eastern boundary off Dampier Street, and along the southern boundary to Wallamore Road. A compliant access ramp (as per AS2890.1) was designed and placed at each of these locations to demonstrate that practical site access is possible. Each of the ramps is required to extend into the filled footprint on the site, however this is not considered a significant issue. A plan of the proposed access ramps is included in the plans in Appendix B.

9.5. Stormwater Drainage

Council have previously advised (as per Jewry Street preliminary design plans (Ref: SK1098-001) that the preferred location for stormwater drainage is to follow the existing drainage line that runs north-south approximately midway through the site, and to run beneath the extended Jewry Street roadway and then east to the existing fully along the western side of the Tamworth Racecourse.

The filled site levels for sewer servicing provide a suitable landform to enable this to be achieved – the site slopes towards the centre from high points in the south-west and north-east corners towards a low point along the northern boundary mid-block – almost exactly in the location of the proposed stormwater drainage line identified by Council. Achieving 1% grade along roadways and kerblines is considered achievable and will approximately replicate the 1.25% sewer grades.

In that regard, a satisfactory stormwater drainage strategy is considered easily achievable and further detailed stormwater drainage analysis is not considered necessary at this time.

9.6. Summary of Design Elements

A plan detailing the proposed servicing methodology is included in Appendix B. In summary;

- The most disadvantaged locations on the site are the north-east and south-west corners that are the furthest from the DN900 sewer main;
- Filling the site to enable 100% servicing will require approximately 155,000 cubic metres of fill and depths up to 3.5m at the most disadvantaged locations;
- Filling the site increases the minimum cover over the existing DN900 pipe;
- A concept design for crossing the existing DN900 to connect the southern side of the site to the pump station has been included and is considered to be safe and practical.
- The strategy has a degree of flexibility built-in; the required fill levels are not fixed or constrained, and therefore can be adjusted to suit the adopted site and road layout.
- The foremost constraint is the cost of the earthworks to achieve the required fill levels;

The locations, adopted alignments and required fill levels at each node is included in the plans in Appendix B. Detailed calculations used in the determination of fill levels are included in the tables in Appendix D. *It should be noted that these are concept alignments and levels only, and are intended to demonstrate that serviceability is possible. Detailed design of the sewer network and required fill levels should be completed during the detailed design stage once a site layout has been confirmed.*

10. Capital and Operating/Maintenance Costs

Without detailed design data, including the pump station geometry and pump details, the detention storage system and odour/septicity control information, it is not possible to determine accurate life cycle costs.

However, using the preliminary design information determined in this report, and based on benchmarking capital and operating costs published in the *NSW Water and Sewerage Benchmarking Report* (NSW DPI), the *NSW Reference Rates Manual – Valuation of Water Supply, Sewerage and Stormwater Assets* (NSW DPI, Office of Water) and reference rates from projects we have previously been involved with, we estimate the initial capital cost of the construction of the gravity network for the full developed site as well as the temporary sewer pump station and any odour/septicity control measures will be in the order of \$500,000. We estimate the cost of the off-line detention storage tanks to be in the order of \$35,000 per 250,000 litre tank.

Note that the required capacity and therefore cost of the detention storage tanks may be spread over a number of stages. Also, Council-supplied flow data may indicate a smaller detention volume is required, and the timing of the Plain Street Pump Station upgrade may align with development staging, and so the final projected number of tanks may not actually be required.

Operating costs (including annual maintenance, operating and electricity costs) for the temporary pump station system and gravity sewer network are estimated to be in the order of \$30,000 annually.

The custodian of the gravity-based piped network discharging to the pump station (the internal network upstream of the pump station), with respect to asset ownership and maintenance/renewal responsibility will ultimately be Tamworth Regional Council once the temporary pump station and detention storage system is de-commissioned.

11. Recommendations for Detailed Design

The detailed design of the system will be dependent on the finalisation of several critical design criteria, including the following;

- Final site layout including, if available, expected site usage and tenancies;
- Re-evaluation of Equivalent Population (EP) based on revised site usage data to determine and more accurate design flows at the time of DA/development;
- Confirmation of the proposed site floor levels to be adopted;
- Analysis and modelling results of the capacity of the existing 900mm sewer main (the receiving main), including dry and wet weather flows and capacity, diurnal patterns, and time-based flow characteristics during and after rainfall events. Liaison with Tamworth Regional Council will be required to obtain this information, including the receipt of flow meter data;
- Confirmation from Tamworth Regional Council of the required detention storage time parameters (see above);
- Continued collaboration with TRC and confirmation, if available, of the timing of the Plain Street Pump Station Upgrade.

At present, as the project is at the early stages of re-zoning, there is insufficient design input data to undertake a detailed design for the site, nor is it necessary to undertake such design work at this planning phase. Information required for detailed design includes determination of the size, geometry and pump requirements for the sewer pump station. Following confirmation of the design inputs identified above a more robust design and cost estimate, including life cycle costing, can be developed. However, this report has identified the options explored and the viability of the options that confirm potential serviceability of the proposed development.

12. Summary

The proposed development consists of a re-zoning of two existing lots in Taminda from RU4 – Primary Production Small Lots to a mixture of B5 – Business Development and IN1 – General Industrial, with the intention of developing the site into a mixed business/industrial development consisting of 41 business site and 14 industrial sites.

A feasibility analysis to determine the potential for sewer serviceability of the site has been prepared based on a direction from Tamworth Regional Council that the site must ultimately be serviced by a conventional gravity fed system discharging to the existing sewer network.

Site investigations and preliminary design work revealed opportunities and constraints within the site and the existing sewer network, and as the project is currently at re-zoning stage there is insufficient data to enable a detailed design to be completed. However, a gravity based sewer network discharging to the existing DN900 main, facilitated by filling the site to provide the minimum cover and depth of grade required, is confirmed as feasible based on the preliminary design work completed. In the short-term, and until the Plain Street Pump Station upgrade is complete, the network will discharge to a temporary pump station and off-line storage system that will have a timed discharge to the existing DN900. In the long-term, the gravity based network will discharge to each of the three existing manholes on the DN900.

The investigative work undertaken in this servicing strategy has confirmed three important servicing requirements;

1. The site can be serviced by an ultimately gravity fed network provided the site is filled to the required level;
2. The gravity based network can be connected in the short-term to a temporary pump station and off-line storage system;
3. Vehicular access and stormwater drainage requirements are able to be satisfactorily achieved with a filled site strategy.

In our opinion, a sewer servicing strategy comprising an ultimately gravity fed network discharging to the existing DN900 main, complemented by a short-term pump station and off-line delayed discharge storage system, is achievable in both the short-term and long-term situations, and does not prevent the satisfactory design of vehicular access or stormwater drainage networks to the site.

13. Limitations of This Report

This report has been tailored to investigate sewer servicing issues in the area of interest, being 55 Dampier Street, Taminda (Lots 2 & 3 in DP1234850).

We consider that the report accurately reflects the conditions for the area of interest at the time the report was prepared (with updates as noted within this report). The results of this assessment should be reviewed if conditions change in the future. This report has been prepared using information provided to Kelley Covey Group from multiple sources. The accuracy of the information provided will determine the accuracy of the report findings. Kelley Covey Group holds no responsibility for the accuracy of the supplied information and data.

All life cycle cost estimates are provided for estimating and preliminary design purposes only, and cannot be considered to be representative of the actual costs of the final adopted and design system.

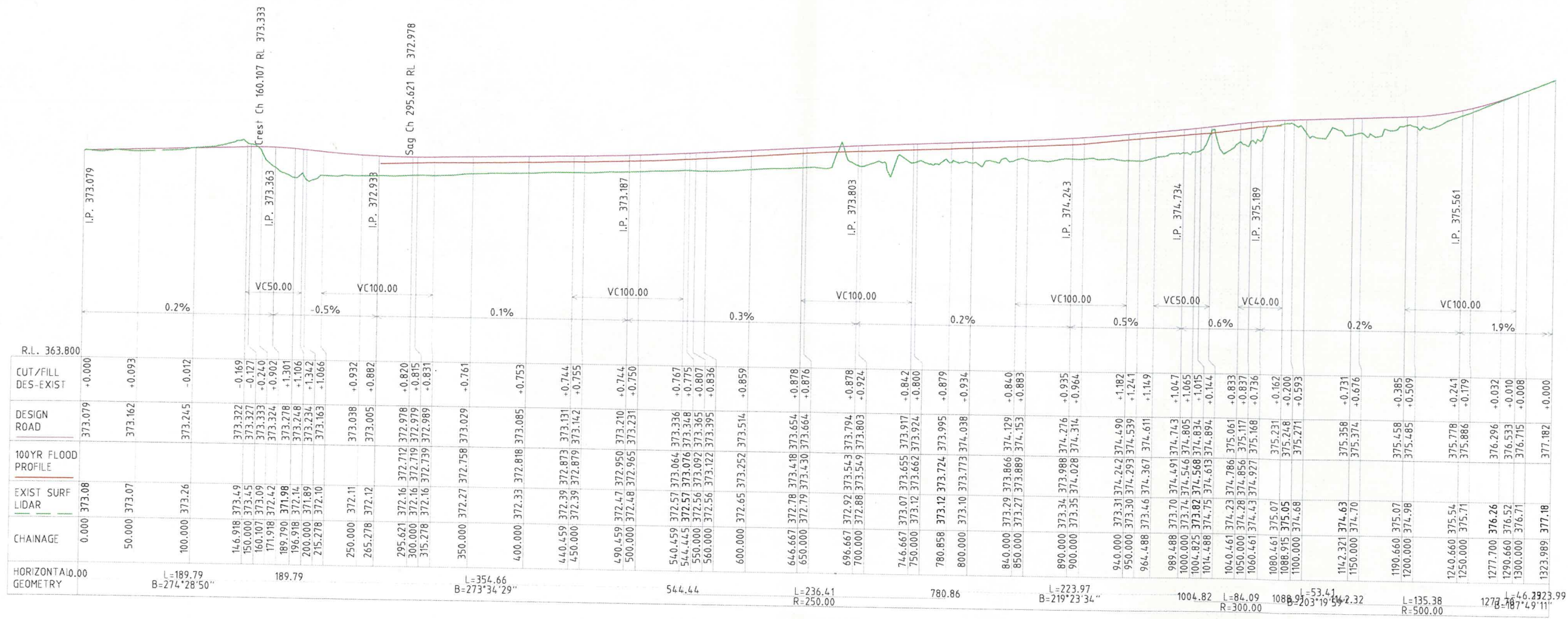
Notwithstanding the above, this report has been undertaken for the specific purposes of Elton Consulting Pty Ltd, and is solely for the use of them.

This report should only be used in full, and may not be used to support objectives other than those set out herein, except where written approval with comments are provided by Kelley Covey Group.

Appendix A – Jewry Street Extension Preliminary Design (per TRC)



		REGIONAL SERVICES DIRECTORATE		CHECKED: _____ DATE: _____		TAMWORTH REGIONAL COUNCIL		DATUM	SCALES AS SHOWN
		APPROVED		DESIGNER		PLAN OF PROPOSED ALIGNMENT		A.H.D.	DRAWING NO.
				SENIOR DESIGN & PROJECT ENGINEER		EXTENSION OF JEWRY STREET			
				CLIENT		FROM DAMPIER STREET TO BASS STREET TAMINDA			
A 12-03-18 ISSUED FOR INFORMATION				SURVEYED: LIDAR		CLIENT REP: BM		A1	
REV DATE DESCRIPTION				DESIGNED: DB		JOB NO: DSJN1098		SK1098-001	



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DIAL1100
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REGIONAL SERVICES DIRECTORATE

CHECKED: DESIGNER DATE: _____

CHECKED: SENIOR DESIGN & PROJECT ENGINEER DATE: _____

CHECKED: CLIENT DATE: _____

JEWRY STREET EXTENSION - 100YR FLOOD IMMUNITY

SURVEYED LIDAR CLIENT REP BM DESIGNED DB JOB NO. DSJN1098

TAMWORTH REGIONAL COUNCIL

EXTENSION OF JEWRY STREET
FROM DAMPIER STREET TO BASS STREET TAMINDA

DATUM SCALES AS SHOWN

A.H.D. DRAWING NO.

A1 SK1098-004

APPROVED

CIVIL CONSTRUCTION MANAGER DATE: _____

12-03-18 ISSUED FOR INFORMATION

REV DATE DESCRIPTION

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Full Size 1:2000, Half Reduction 1:4000

SCALE (m)

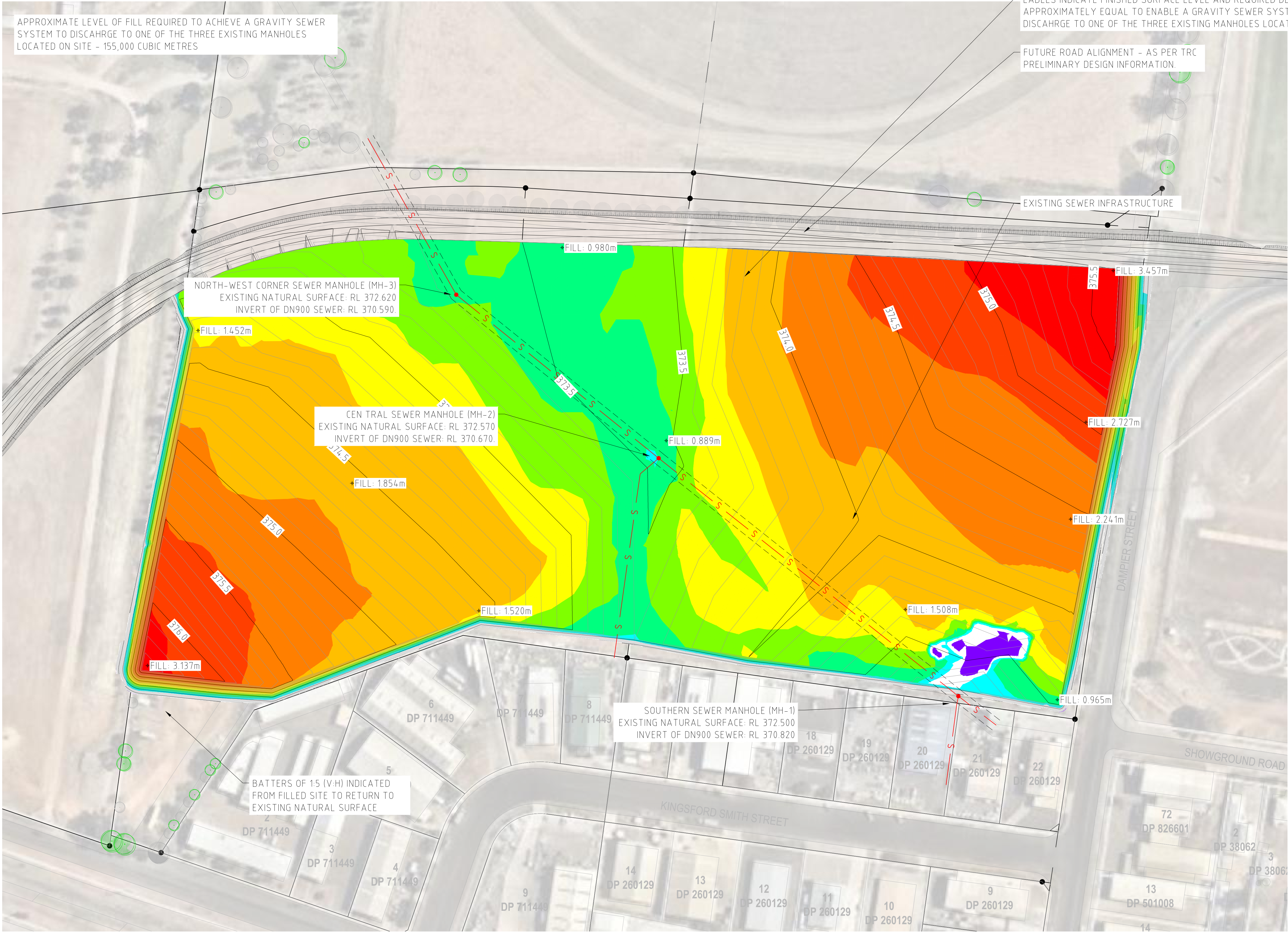
0 1 2 4 6

Full Size 1:100, Half Reduction 1:200

SCALE (m)

"Take 5"

Appendix B – Preliminary Servicing Strategy Design Drawings



SITE FILL LEGEND			
No.	Min. Level	Max. Level	Colour
1	-0.446	0.000	
2	0.000	0.500	
3	0.500	0.750	
4	0.750	1.000	
5	1.000	1.250	
6	1.250	1.500	
7	1.500	2.000	
8	2.000	2.500	
9	2.500	3.000	
10	3.000	3.500	

NOTE: EXISTING NATURAL SURFACE LEVEL SURFACE MODEL
DERIVED FROM LIDAR DATA (NSW GOVT. SPATIAL SERVICES)
POINT CLOUD DATA
REF: Tamworth201401-LID1-C3-AHD_2986558_56_0002_0002.

ULTIMATE GRAVITY SEWER NETWORK FILL LEVELS

SCALE 1:1000 (A1)
SCALE 1:2000 (A3)
CONTOURS: MAJOR 0.5m, MINOR 0.1m

Checked - MF Approved - JC
Design - MF Drawn - MF
Scales - AS SHOWN Date - 31.03.20
Document Stage - PRELIMINARY

KELLEY COVEY
GROUP PTY LTD
Consulting Civil, Structural
and Environmental Engineers
Project Management,
Planning and
Landscape Architecture
ACN 099 097 800
ABN 3709 9097 800

DIRECTOR:
KEVIN COVEY
MANAGER:
JUSTIN CANT
BEng, CPEng, MIEAust, RPEQ, MSPEPENG
BEng, CPEng, MIEAust, NPER, RPEQ
ASSOCIATES:
DAMIAN COOK
162 MARIUS STREET
PO BOX 199, TAMWORTH NSW 2340
Ph (02) 6766 1944 Fax (02) 6766 6553
email: engineers@kelleycovey.com.au

Drawing title -
PRELIMINARY SEWER NETWORK
LAYOUT AND SPS LOCATION

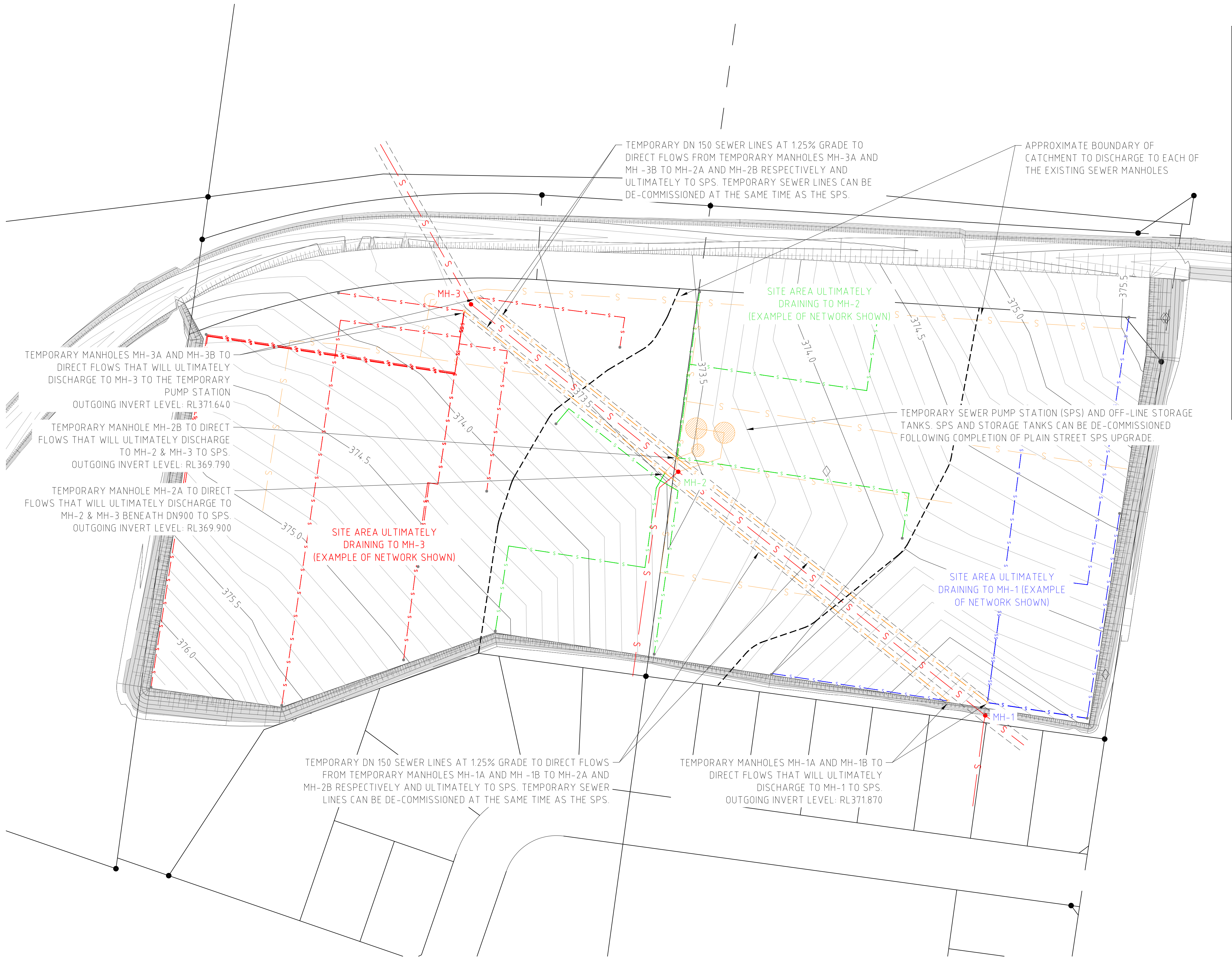
Project - SEWER SERVICING STRATEGY
TAMINDA EMPLOYMENT LANDS
Client - ELTON CONSULTING PTY LTD

Site -
55 DAMPIER STREET
TAMINDA NSW 2340

Issue	Date	Description	By
B	15.06.20	ISSUED FOLLOWING COUNCIL COMMENTS	MF
A	31.03.20	PRELIMINARY ISSUE	MF
Project T196893		Sheet No. 2 of 3	
Digital Ref: T196893 - Rev B		Issue :	B
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SEWER SERVICING STRATEGY
EXPLANATION NOTES

1. SITE TO BE FILLED TO ENABLE ULTIMATE GRAVITY DISCHARGE TO EXISTING DN900 MAIN AT EITHER MH-1, MH-2 OR MH-3 AS SHOWN.
2. TEMPORARY RECEIVING MANHOLES AND DN150 SEWER LINE TO BE CONSTRUCTED EITHER SIDE OF MH-1, MH-2 AND MH-3 TO ACCEPT FLOWS AND DIRECT THEM TO TEMPORARY SEWER PUMP STATION (SPS) AS SHOWN.
5. OUTGOING INVERT LEVEL OF TEMPORARY MANHOLES REPRESENTS THE OBVERT LEVEL OF THE EXISTING DN900 PIPE PLUS 50mm AS DIRECTED BY TAMWORTH REGIONAL COUNCIL, PLUS A FURTHER 100mm TO ALLOW GRADE TO ULTIMATELY DISCHARGE FROM TEMPORARY MANHOLES TO EXISTING MANHOLES.
6. ANTICIPATED INLET LEVEL OF SPS: RL369.450 (TO BE CONFIRMED)
7. TEMPORARY SPS TO DISCHARGE TO MH-2 AS SHOWN.
8. TEMPORARY SPS TO HAVE OFF-LINE STORAGE IN THE EVENT OF WET WEATHER REDUCING CAPACITY IN THE EXISTING DN900 LINE.
9. TEMPORARY SPS AND TEMPORARY DN150 SEWER LINES TO BE DE-COMMISSIONED UPON COMPLETION OF THE PLAIN STREET SEWER PUMP STATION UPGRADE OR AS DIRECTED BY COUNCIL.
10. FLOWS DISCARDING TO TEMPORARY MANHOLES TO BE RE-DIRECTED TO MH-1, MH-2 OR MH-3 (AS APPROPRIATE) FOLLOWING DE-COMMISSIONING WORKS.
11. NETWORK LAYOUT AND FINISHED FILLED SURFACE LEVELS ARE INDICATIVE ONLY AND ARE ONLY TO BE USED FOR CONCEPT/FEASIBILITY PURPOSES. ALL FINISHED SURFACE LEVELS, NETWORK LAYOUTS AND PIPE GRADES/INVERTS WILL NEED TO BE CONFIRMED AS PART OF DETAILED DESIGN WORKS UPON ADOPTION OF A PROPOSED SITE LAYOUT.



NOTE: EXISTING NATURAL SURFACE LEVEL SURFACE MODEL
DERIVED FROM LIDAR DATA (NSW GOVT. SPATIAL SERVICES)
POINT CLOUD DATA
REF: Tamworth201401-LID1-C3-AHD_2986558_S6_0002_0002.

ULTIMATE GRAVITY SEWER NETWORK PROPOSAL SCHEMATIC

PROPOSED DN150 BETWEEN MH-2A &MH-2B



SCALE 1:1000 (A1)
SCALE 1:2000 (A3)
CONTOURS: MAJOR 0.5m, MINOR 0.1m

Issue	Date	Description	By
B	22.06.20	ISSUED FOLLOWING COUNCIL COMMENTS	MF
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Issue	Date	Description	By
Project	T196893	Sheet No. 3 of 5	
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Scales - AS SHOWN	Date - 31.03.20
Document Stage -	PRELIMINARY

KELLEY COVEY
GROUP PTY LTD

Consulting Civil, Structural
and Environmental Engineers
Project Management,
Planning and
Landscape Architecture

ACN 099 097 800
ABN 3709 9097 800

DIRECTOR: KEVIN COVEY MANAGER: JUSTIN CANT	BEng,CPEng,MIEAust,RPEQ,MSPEPNG BEng,CPEng,MIEAust,NPER,RPEQ	ASSOCIATES: DAMIAN COOK
162 MARIUS STREET PO BOX 199, TAMWORTH NSW 2340	Ph (02) 6766 1944 Fax (02) 6766 6553 email: engineers@kelleycovey.com.au	

Drawing title -
CONCEPT SEWER NETWORK
LAYOUT AND SPS LOCATION

Project - SEWER SERVICING STRATEGY
TAMINDA EMPLOYMENT LANDS
Client - ELTON CONSULTING PTY LTD

Site -
55 DAMPIER STREET
TAMINDA NSW 2340

NOTES:

1. SEE TABLES IN APPENDIX C OF SUPPLEMENTARY SEWER
SERVICING REPORT (REF: 528661tr) FOR ALIGNMENT
DISTANCES AND GRADE INFORMATION.
2. SEWER ALIGNMENTS ARE FOR CONCEPT PURPOSES ONLY
TO DEMONSTRATE SERVICEABILITY - FINAL SEWER
ALIGNMENTS AND FILL REQUIREMENTS TO BE DETERMINED AS
PART OF DETAILED DESIGN STAGE.



ULTIMATE GRAVITY SEWER NETWORK - SERVICING NODES

SCALE 1:1000 (A1)
SCALE 1:2000 (A3)
CONTOURS: MAJOR 0.5m, MINOR 0.1m

Issue	Date	Description	By
B	22.06.20	ISSUED FOLLOWING COUNCIL COMMENTS	MF
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Project T196893 Sheet No. 4 of 5			
Digital Ref: T196893 - Rev B Issue : B			
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Scales - AS SHOWN	Date - 31.03.20
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DAMIAN COOK

162 MARIUS STREET
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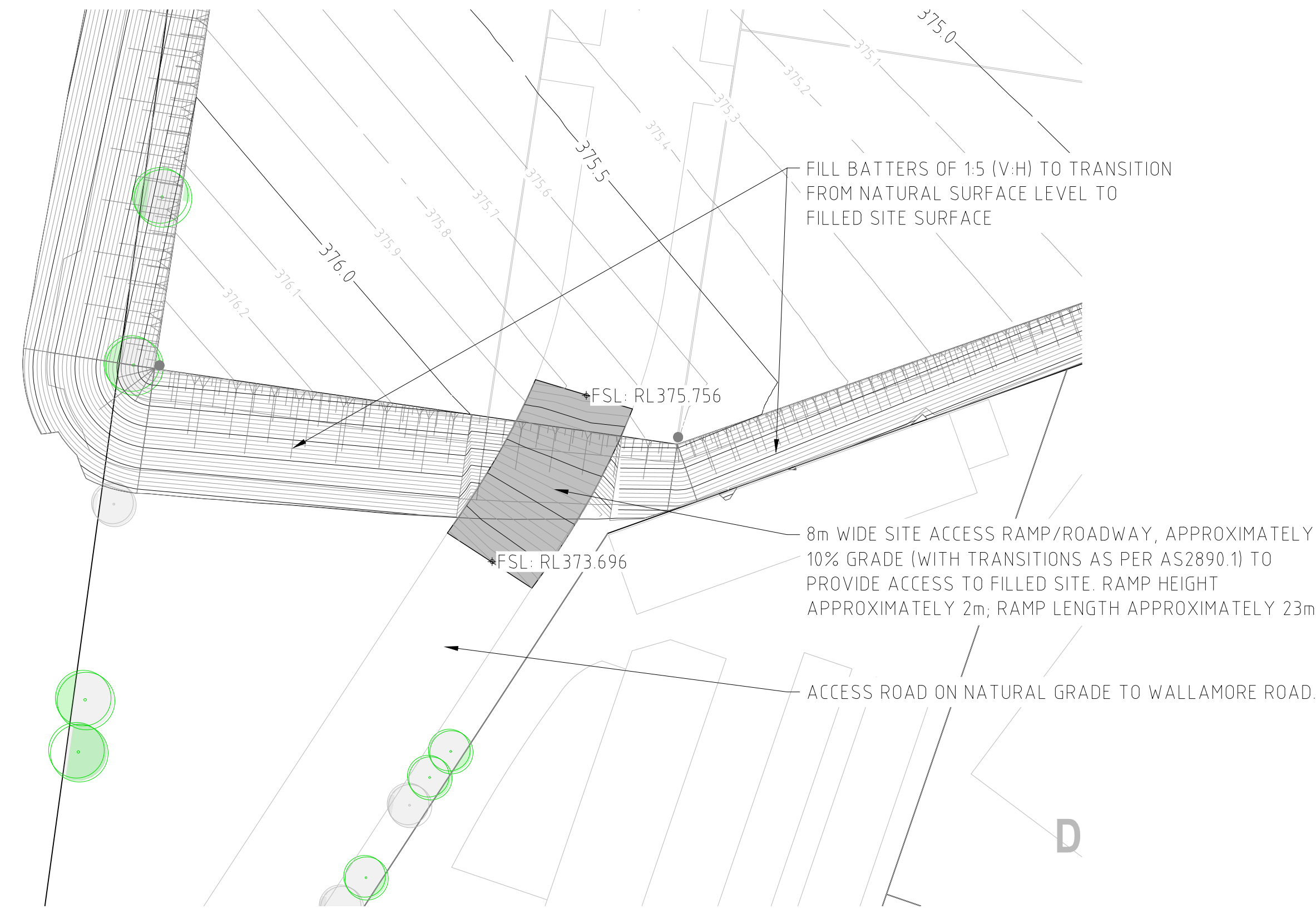
Ph (02) 6766 1944 Fax (02) 6766 6553
email: engineers@kelleycovey.com.au

Drawing title -
CONCEPT SEWER NETWORK
CONNECTION NODE INFORMATION

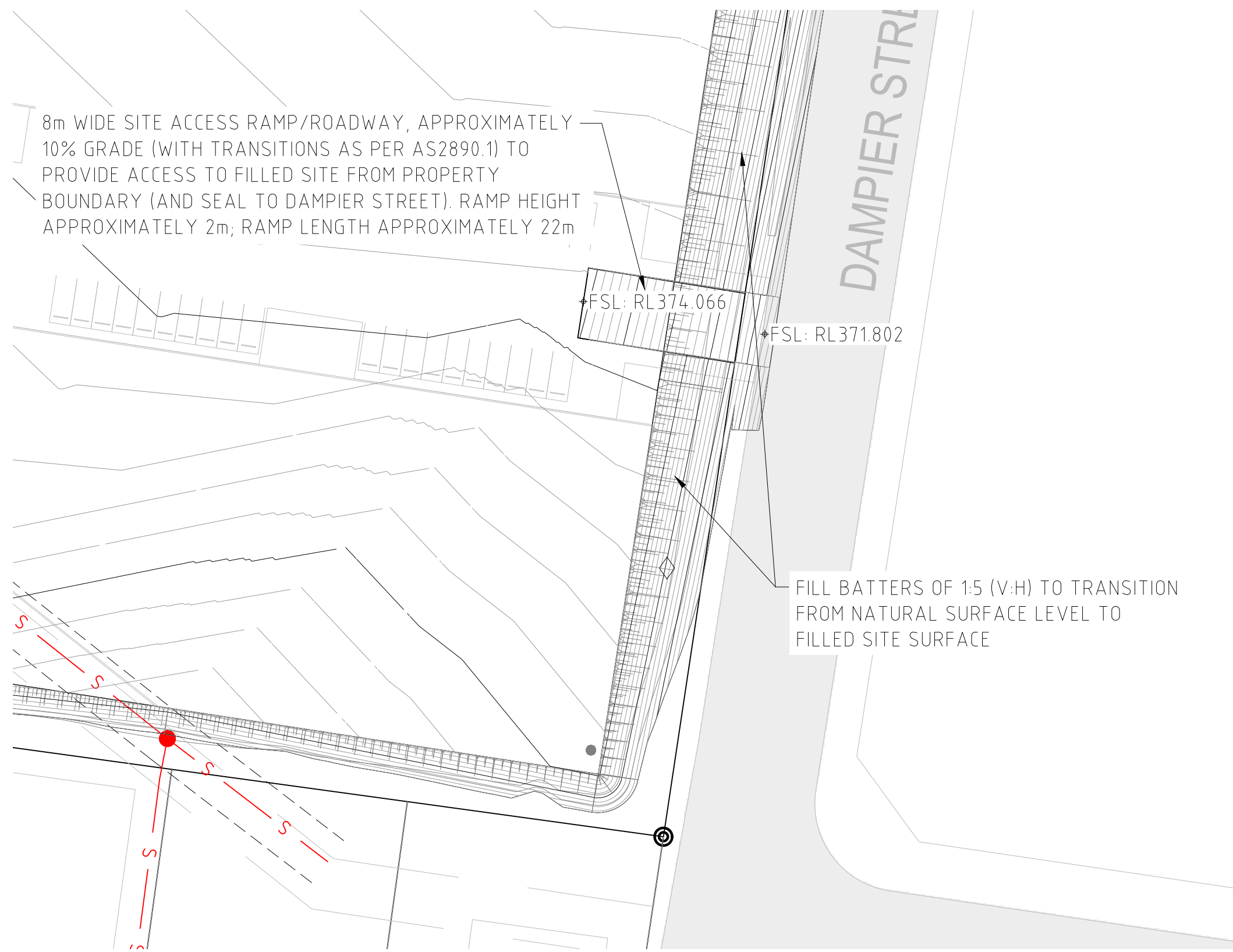
Project - SEWER SERVICING STRATEGY
TAMINDA EMPLOYMENT LANDS

Client - ELTON CONSULTING PTY LTD

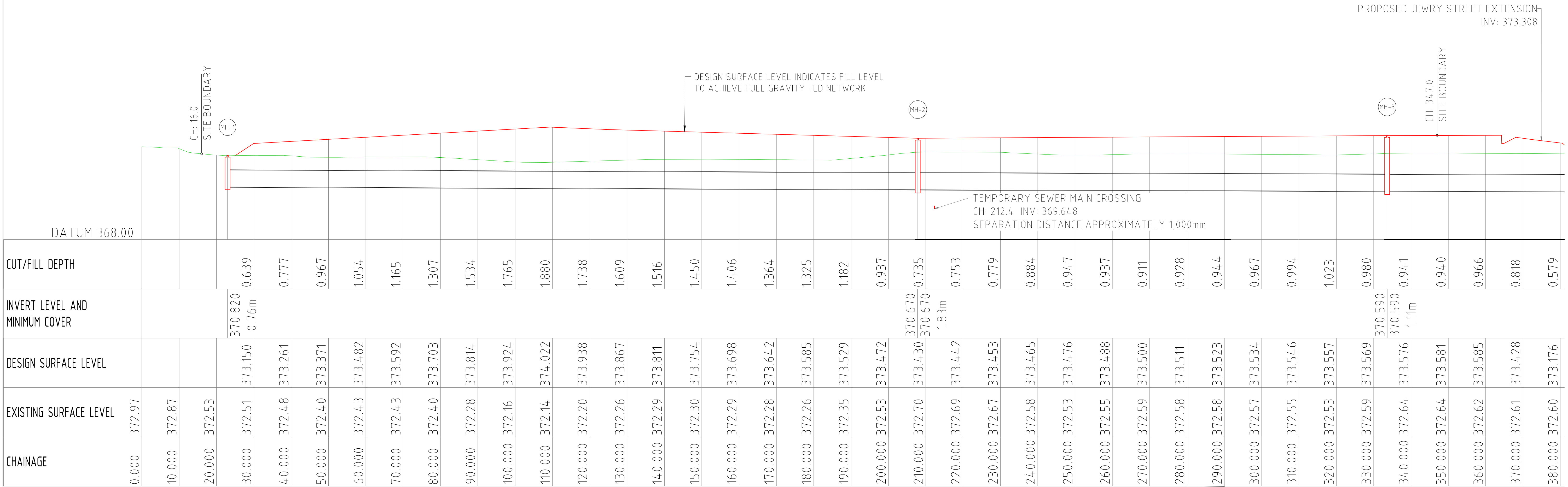
Site -
55 DAMPIER STREET
TAMINDA NSW 2340



SITE ACCESS RAMP - SOUTHERN BOUNDARY TO WALLAMORE ROAD
SCALE 1:500 (A1)



SITE ACCESS RAMP - EASTERN BOUNDARY TO DAMPIER STREET
SCALE 1:500 (A1)



EXISTING DN900 SEWER MAIN - LONGITUDINAL SECTION

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Design – MF Drawn – MF

Scales – AS SHOWN Date – 31.03.20

Document Stage – PRELIMINARY

Consulting Civil, Structural and Environmental Engineers
Project Management, Planning and Landscape Architecture

ACN 099 097 800
ABN 3709 9097 800

DIRECTOR:
KEVIN COVEY
MANAGER:
JUSTIN CANT

BEng,CPEng,MIEAust,RPEQ,MSPEPENG
BEng,CPEng,MIEAust,NPER,RPEQ

162 MARIUS STREET
PO BOX 199, TAMWORTH NSW 2340

ASSOCIATES:
DAMIAN COOK

Ph (02) 6766 1944 Fax (02) 6766 6553
email: engineers@kelleycovey.com.au

Drawing title –
SITE ACCESS CONCEPTS AND
EXISTING DN900 LONG SECTION

Project – SEWER SERVICING STRATEGY
TAMINDA EMPLOYMENT LANDS

Client – ELTON CONSULTING PTY LTD

Site –
55 DAMPIER STREET
TAMINDA NSW 2340

B	22.06.20	ISSUED FOLLOWING COUNCIL COMMENTS
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Issue Date	Description	By
Project	T196893	Sheet No. 3 of 5
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Appendix C – Preliminary Pump Station Design Calculations

Daily Flow Estimate				
	Business	Industrial	TOTAL	Notes
Gross Lot Area (ha)	1.55	3.55	5.1	Gross Lot Area calculated from site layout plan. Assumed 100% site coverage per lot.
EP/Unit	75	150		From WSA-02 Table A1 - Local Commercial and Future Industrial Areas
EP	116.25	532.5	648.75	
ADWF	1.36		I/s	
d	4.25			WSA-02 Figure B1
PDWF	5.79		I/s	
Total Site Area (ha)	8.98			
Portion Wet	0.7			Estimated - assuming lot filling to Flood Planning Level
GWI	0.15715		I/s	
Portion _{Impervious}	0.8			Estimated from site layout plan
A _{eff} (ha)	3.59			
C	1.17			WSA-02 Table B1 and previous design experience
I _{1,2} (mm)	40			From BOM
Factor _{size}	1.1963			
Factor _{containment}	1.0			WSA-02 Table B3 - Two (2) year ARI containment standard
I (mm)	47.85			
IIF	5.6		I/s	
Design Flow	11.6		I/s	

Appendix D – Site Fill Levels Calculations

Ex Node	EX-INV	Ex-FFL	Ex Depth	Proposed FFL (Full Gravity)	Prop. Network Discharge Level	New MH Inv	Cover to New MH Inv	Dist to MH-2A	MH-2A Inv (@1.25%)
	(RL - AHD)	(RL - AHD)	(m)		(RL - AHD)	(RL - AHD)	(m)	(m)	(RL - AHD)
MH1	370.82	372.5	1.68	373.15	371.77	371.87	1.11	172	369.72
MH2	370.67	372.57	1.90	373.43	371.62	371.72	1.54	15	371.5325
MH3	370.59	372.62	2.03	373.572	371.54	371.64	1.762	122	370.115

Table 1 – Calculations to determine invert levels of new manholes and invert of pipe crossing DN900

Node	MH1		MH2		MH3		Adopted Fill Level
	Dist	Min FSL	Dist	Min FSL	Dist	Min FSL	
1			347	376.96	315	376.48	376.48
2			256	375.82	225	375.35	375.35
3			331	376.76	147	374.38	374.38
4					60	373.29	373.29
5			288	376.22	253	375.70	375.70
6			205	375.18	171	374.68	374.68
7			161	374.63	126	374.12	374.12
8			151	374.51	186	374.87	374.51
9			100	373.87	105	373.85	373.85
10			69	373.48	97	373.75	373.48
11			82	373.65	84	373.59	373.59
12			79	373.61	120	374.04	373.61
13	140	374.52	87	373.71			373.71
14	84	373.82	152	374.52			373.82
15	121	374.28	132	374.27			374.27
16	249	375.88	164	374.67			374.67
17	141	374.53	206	375.20			374.53
18	228	375.62	297	376.33			375.62
19	145	374.58	216	375.32			374.58
20	47	373.36					373.36

Table 2 – Calculations to determine minimum fill levels at each sewer node