

APPENDIX S – CONCEPT WATER AND SEWER ASSESSMENT

RMA Engineers Pty Ltd



Toowoomba Region Sports Precinct | Charlton

Concept water and sewer assessment

Date 23 June 2022

REPORT CONTROL SHEET

RMA ref. no:	16567
Project name:	Toowoomba Region Sports Precinct Charlton
Report title:	Concept water and sewer assessment
Report author:	Joseph Saunders

Document control						
Revision	Author	Reviewer	Approved for issue			
			Name	RPEQ no.	Signature	Date
0	JIS	BSD	Stuart Doyle	9011		7/12/21
1	JIS	BSD	Stuart Doyle	9011		20/4/22
2	JIS	BSD	Stuart Doyle	3011		31/05/22
3	JIS	JIS	Joseph Saunders	18468		23/06/22

Disclaimer:

This report is a professional opinion based on the information available at the time of writing. It is not intended as a quote, guarantee or warranty and does not cover any latent defects.

This report will comment on the Civil infrastructure to the project and may outline probable costs but the extent of the commission of RMA does not extend to detailed cost feasibility, as such the costs should not be relied on for financing arrangements.

The conclusions in this report should not be read in isolation. We recommend that its contents be reviewed in person with the author so that the assumptions and available information can be discussed in detail to enable the reader to make their own risk assessment in conjunction with information from other sources.

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OVERALL PLAN

- 1 Main Access from Gowrie Junction Road
- 2 Toowoomba Connection Rd Highway Entry - Left In / Left Out
- 3 Tree Lined Avenue Entry Road
- 4 Premier Hub Setdown Area and Overflow Parking
- 5 Premier Hub
- 6 Premier Oval
- 7 Premier Rectangular Field
- 8 Rectangular Field Precinct 1
- 9 Formalized Car Parking
- 10 Open Parkland and Maintenance Compound
- 11 Oval Field 1
- 12 Oval Field 2
- 13 Diamond Fields Precinct
- 14 Rectangular Field Precinct 2
- 15 Rectangular Field Precinct 3
- 16 Shooting and Archery Precinct
- 17 Oval Field 3
- 18 District Park
- 19 Boundary Planting Screen Buffers
- 20 Stormwater Treatment Channels and Basins
- 21 Upgrade of Gowrie Junction Road between new Site Access and the Toowoomba Connection Road. Upgrade to include 2.5m on-road cycle lanes in each direction.



Figure 2 Development Layout

OVERALL STAGING PLAN

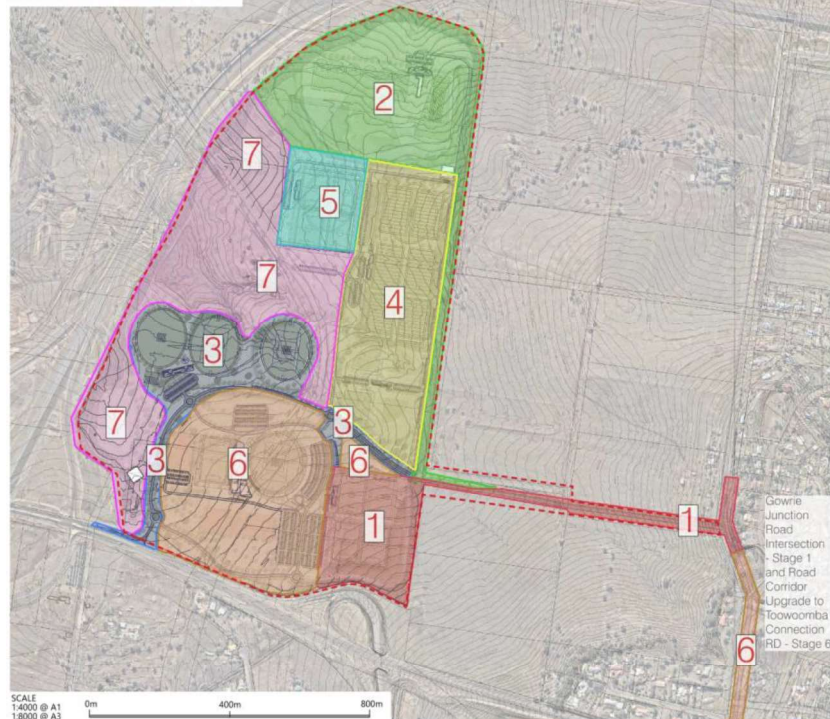


Figure 3 Development staging

details.

2.1.4 Benchmarking

The proposed development loading has been considered against WSA02:2014 Table B1 Equivalent Populations for Synchronous Discharges and truck out data provide for the recent Highfields sports precinct development.

2.2 Design

2.2.1 Considerations

Options for sewage management and probable connection points to sewer include:

1. Onsite sewage facility for treatment and land application
2. Holding tank and truck out
3. Sewage pumping station and rising main discharge to Tallowwood Boulevard sewage pumping station (identified as SPS59).
 - a. TRC Water Project Services – Network Planning have advised that, whilst SPS59 has not been designed for the proposed sports precinct, the SPS59 pump rate is higher than the design rate and there will be sufficient capacity within this pump station. Since a long rising main with a very low demand will be required to get from TRSP to SPS59, there are concerns with the development of hydrogen sulphide in the rising main. The rising main will also discharge into a residential area, so the impacts of any odour issues also need to be given due consideration.
4. Gravity sewer to temporary sewage pumping station in Nass Road.
5. Gravity sewer extension from temporary sewage pumping station in Nass Road to Draper St SPS (identified as SPS71) aligning with TRC plans to ultimately decommission the temporary sewage pumping station in Nass Road.
 - a. TRC Water Project Services – Network Planning have advised that at SPS71 there is currently ample spare capacity available. Full development of the industrial area at Charlton is expected to push this pump station beyond capacity, however there are future augmentations proposed to overcome these issues. The addition of the TRSP will provide only minimal change to the ultimate demand, which can be accommodated when reassessing the size and timing of future works.

2.2.2 Sewer load

Based on interrogation of the TRSP patronage data against the Highfields Membership numbers, we find that each member (Highfields) is equivalent to 2 TRSP patrons (i.e. 1 player and 1 spectator) and attracts 4 unique visits being (3 visits per week (2 x training and 1 game) + 1 visit from opposing team). Therefore 1 member is equivalent to 8 patrons.

When the membership and patronage data is related to the Highfields pump out data, we find that the load generation is conservatively equivalent to 0.0175 EP/patron (at 180L/EP/day).

As winter represents the high usage, the sewer load analysis is based on the winter data only.

Table 1 shows the average dry weather flow rate expected to be generated during the peak hour of maximum expected patronage (by stage).

Table 1 Average dry weather flow rate (during peak hour of patronage)

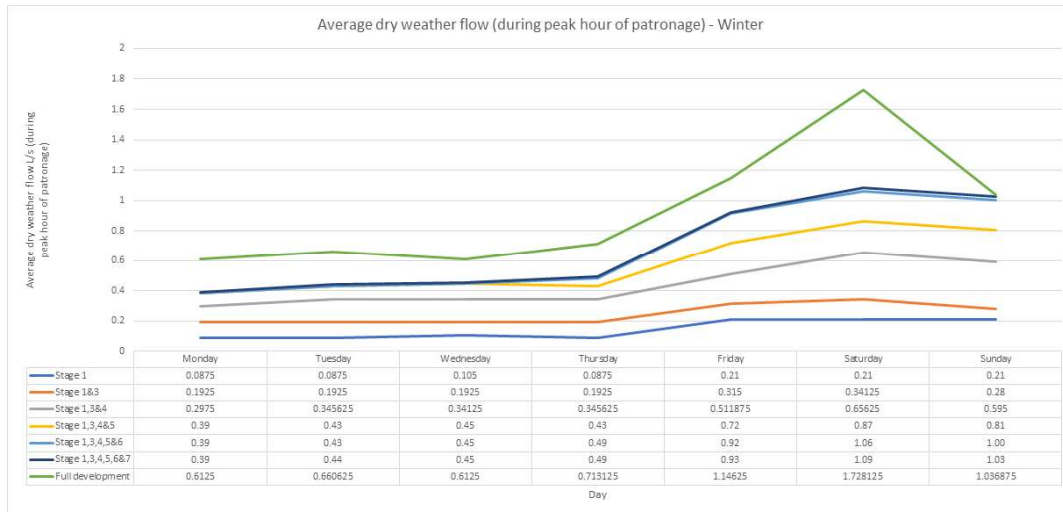
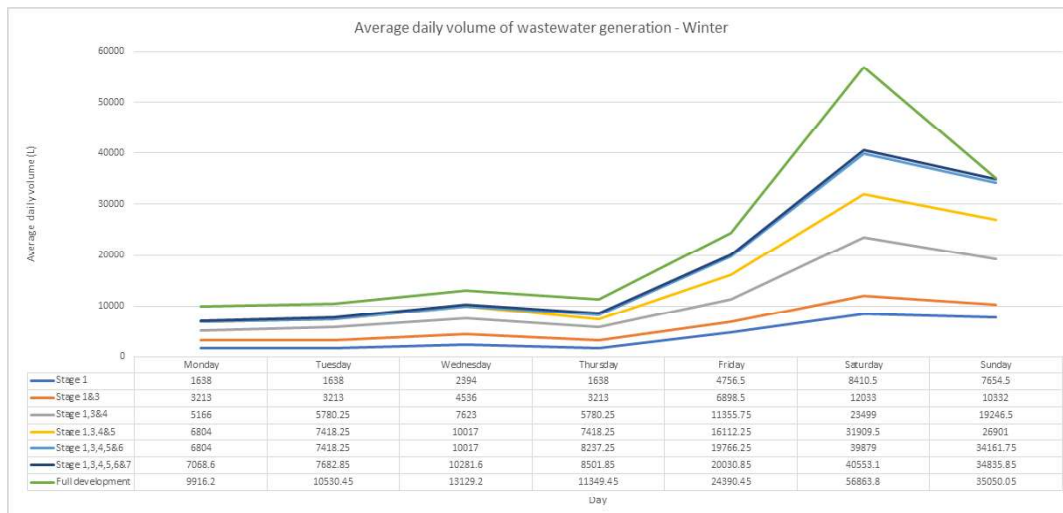


Table 2 shows the average daily volume of wastewater expected to be generated during maximum expected patronage (by stage)

Table 2 Average daily volume of wastewater generation



2.2.3 Options Assessment

Further to the sewer management options and probable connection points, an assessment of the advantages and disadvantages of each option has been prepared. Refer to **Appendix B**.

The assessment outlines a high-level delivery strategy by stage, comparative cost estimate and pros/cons for each option.

It should be noted that there has been no detailed design and the actual sizing/costs may vary (this will be more of a factor in regard to Option 2 – OSSF).

It is our opinion that Option 4 - Gravity sewer to existing sewer infrastructure and temporary sewage pumping station in Nass Road, represents the best option for servicing the proposed development in the short term while, Option 5 - Gravity sewer extension from temporary sewage pumping station in Nass Road to Draper St SPS, represents the best option for servicing the proposed development in the long term, both options are based on if the capacity is available in the network at this location.

TRC Water Project Services – Network Planning estimate a peak wet weather flow rate of 10.3L/s. A 150mm diameter sewer at 1:150 minimum grade has capacity for 10.3L/s at a flow depth of less than 70% of pipe diameter. It is confirmed that at a 1:150 grade, the sewer infrastructure can service each of the facilities identified in Appendix B and comply with TRC Planning Scheme Policy Schedule 6.3 PSP 3 design standards.

The sewer layout presented in Appendix B has been prepared taking into consideration the topography of the land and TRC Planning Scheme Policy Schedule 6.3 PSP 3 design standards. The design can achieve compliance with minimum grades, maximum depths (excluding underbore of Second Range Crossing) and minimum cover to the TRC Depot gravity and Nass Road Temporary sewer pump station.

In accordance with WSA02:2014 Section 5.3.2, it is recommended that where sewers cross freeways, arterial roads and other designated major road reserves, consideration be given to sizing the sewer one size larger than hydraulically necessary at those crossings to cater for future growth. Consequently, the underbore of the Second Range Crossing and the new gravity sewer downstream of this point is recommended to be a minimum 225mm diameter. To allow for some tolerance in the directional drill install, a minimum grade of 1% is recommended. It is confirmed that a 1% grade can achieve connection as identified in Appendix B.

TRC Water Project Services – Network Planning have reviewed the impact of Option 4 on the existing network (SPS71 at Draper Road) and advised the following:

- The actual pump rate at Draper Rd (SPS71) is lower than the design flow rate (*of the ultimate catchment*), however there is currently ample spare capacity available.
- Full development of the industrial area at Charlton is expected to push this pump station beyond capacity, however there are future augmentations proposed to overcome these issues.
- The addition of the TRSP will provide only minimal change to the ultimate demand, which can be accommodated when reassessing the size and timing of future works.

Based on the above advice, there are no significant issues or extra costs associated with the TRSP development's impact on the existing sewerage network.

3. Potable Water

3.1 Background information

3.1.1 Potable water supply

No previous assessments have been identified regarding potable water supply.

3.2 Water supply demand

3.2.1 Potable water supply

Potable water has been estimated based on at 1.8 times the wastewater load generated. This is based on estimated of water demand to sewer load ratios determined from Queensland Government Department of Energy and Water Supply, Planning Guidelines for Water Supply and Sewerage April 2010 Chapter 6 amended March 2014.

Table 3 shows the estimated average daily volume.

Table 4 presents the estimated average daily flow rate.

A peak hour facto of 4.5 has been applied to determine the likely peak hour demand. The peak hour flow rates are shown in **Table 6**.

Table 3 Average daily volume – potable water

Water demand (L) - daily volume - Winter							
	Stage 1	Stage 1&3	Stage 1,3&4	Stage 1,3,4&5	Stage 1,3,4,5&6	Stage 1,3,4,5,6&7	Full develop
Monday	2948	5783	9299	12247	12247	12723	17849
Tuesday	2948	5783	10404	13353	13353	13829	18955
Wednesday	4309	8165	13721	18031	18031	18507	23633
Thursday	2948	5783	10404	13353	14827	15303	20429
Friday	8562	12417	20440	29002	35579	36056	43903
Saturday	15139	21659	42298	57437	71782	72996	102355
Sunday	13778	18598	34644	48422	61491	62705	63090

Table 4 Average daily flow rate – potable water

Water demand (L/s) - average daily flow rate - Winter							
	Stage 1	Stage 1&3	Stage 1,3&4	Stage 1,3,4&5	Stage 1,3,4,5&6	Stage 1,3,4,5,6&7	Full develop
Monday	0.03	0.07	0.11	0.14	0.14	0.15	0.21
Tuesday	0.03	0.07	0.12	0.15	0.15	0.16	0.22
Wednesday	0.05	0.09	0.16	0.21	0.21	0.21	0.27
Thursday	0.03	0.07	0.12	0.15	0.17	0.18	0.24
Friday	0.10	0.14	0.24	0.34	0.41	0.42	0.51
Saturday	0.18	0.25	0.49	0.66	0.83	0.84	1.18
Sunday	0.16	0.22	0.40	0.56	0.71	0.73	0.73

Table 5 Peak hour flow rate – potable water

Water demand (L/s) - peak hour flow rate based on peaking factor of 4.5 - Winter							
	Stage 1	Stage 1&3	Stage 1,3&4	Stage 1,3,4&5	Stage 1,3,4,5&6	Stage 1,3,4,5,6&7	Full develop
Monday	0.15	0.30	0.48	0.64	0.64	0.66	0.93
Tuesday	0.15	0.30	0.54	0.70	0.70	0.72	0.99
Wednesday	0.22	0.43	0.71	0.94	0.94	0.96	1.23
Thursday	0.15	0.30	0.54	0.70	0.77	0.80	1.06
Friday	0.45	0.65	1.06	1.51	1.85	1.88	2.29
Saturday	0.79	1.13	2.20	2.99	3.74	3.80	5.33
Sunday	0.72	0.97	1.80	2.52	3.20	3.27	3.29

3.2.2 Firefighting flows

Firefighting requirements for commercial facilities depend on the size and classification of the facility.

Whilst the current designs are highly conceptual, the clubhouses proposed for the site (refer to **Appendix C** for details) are likely to be class 9 assembly buildings used for entertainment, recreational or sporting purposes.

AS2419.1:2017 requires:

- Coverage of 1 fire hydrant flowing simultaneously if the fire compartment floor area is less than 1000m² and not more than 2 storeys.

This will cover all the clubhouses excluding the premier hub and clubhouse type N (which will require consideration of fire separation between the two buildings).

AS2419.1:2017 requires:

- Coverage of 2 fire hydrants flowing simultaneously if the fire compartment floor area is more than 1000m² but less than 5000m² and not more than 2 storeys.

This appears that it may be appropriate for Stage 6 of the premier hub.

The minimum unassisted outlet pressure and flow rate per flowing hydrant is

- 200kPa and 10L/s if feed fire hydrants are used (AS2419.1:2017).
- 350kPa and 10L/s attack hydrants are used (AS2419.1:2017).

If the pressure and flow is not available in the water reticulation system, typically storage tanks and firefighting pumps are required to provide the minimum level of service. Note the service requirements for fixed pump systems vary to the above.

The current version of National Construction Code and AS2419.1:2017 can be consulted if further information is required.

A building certifier should be consulted regarding building classification and confirmation of fire compartment sizes and floor areas at the time of proceeding with the design.

3.2.3 Potable water supply source

Connection for the development has been considered from locations to the east of the proposed development site. Appraisal of several options has been considered and is shown in **Appendix E**.

TRC Water Project Services – Network Planning have confirmed that the DN200 water main in Toowoomba Connection Road is the preferred connection point for the TRSP development. This is because it is the only connection point that will achieve 30L/s @ 12m head as per Water infrastructure Policy 2.03. If TRSP has higher fire flow demand, break tanks or alternate design which complies with Australian Standards will be required.

With the design of the access road into the development (off Gowrie Junction Road) being reconsidered, the new alignment and cross section accommodates services to be brought to site along the access road alignment.

TRC Water Project Services – Network Planning are currently reviewing the water supply network study for the area surrounding the TRSP site. The extension of the existing 200mm dia watermain in Toowoomba Connection Road will need to be provided to the TRSP site as a maximum 200mm dia main. Prior to commencing detail design of the main, the designer should consult with TRC Water Project Services as the outcomes of the network planning study may allow for a reduction in the size of the main for part or all of the extension. Ideally the main will be incorporated into the reticulation network to improve turnover and water quality during times of low demand from the sports park.

For the purposes of this report and budget allowances, the assumption of a 200mm dia main will be more than adequate.

4. Construction water

4.1 Background information

4.1.1 Construction water

There has been no previous assessment on demand for water during construction.

4.2 Construction water demand

4.2.1 Construction water

Recent examples of large-scale earthworks projects have used approximately 20,000L water for cut fill construction for each 150mm layer of fill (area of fill approx. 17,500m²). On this site it was observed that the natural material had a field moisture content of 17-20%. The application rate of water for construction works was 7.5L/m³.

Demand for construction water in this report has been determined based on an application rate of 10L/m³ of earthworks.

Demand for water by stage has been calculated based on the volume of earthworks carried out in each stage. **Table 6** below summarises the demands.

Table 6 Construction water - Earthworks

Stage	Cut (m3)	Fill (m3)	kL*
Stage 1 - Rectangular fields (Existing Shooting Club and Archery to continue to be managed as existing)	250,000	54,000	2,500
Stage 2 - Archery and Rifle Range	100,500	109,000	1,090
Stage 3 - Ovals	72,000	146,500	1,465
Stage 4 - Diamond fields and shared fields	142,000	194,000	1,940
Stage 5 - Northern rectangular fields	27,000	40,000	400
Stage 6 -Premier Hub (Stage 1 building, rectangular field and oval, local park)	150,500	167,000	1,670
Stage 7	19,000	15,500	190

*based on 10L/m³ and the greater of the cut or fill volume per stage

Total 9,255

5. Irrigation

5.1 Background information

5.1.1 Irrigation water

Bligh Tanner prepared a report for Otium Planning Group titled Irrigation Options Assessment.

Table 2 of the Irrigation Options Assessment report identified the following irrigation requirements for the proposed site uses. Refer to **Figure 5** below for extract from report.

Table 1: Best Practice Guidelines for Turf Irrigation by use/category (Sydney Water, 2011)

Category	Use Description	Best Practice Irrigation Demand (ML/Ha/yr)
Elite	State/National competition, stadiums	4.0 - 9.0
Regional	Regional/Premier grade	2.5 - 5.0
Local	Local public sports fields	1.5 - 3.5
Passive	Neighbourhood parks/lawn areas	0.0 - 2.5

Figure 5 Irrigation demands

The irrigation rates (mm/m²/week) equate to (low/high):

- State – 8/18
- Regional – 5/10
- Local – 3/7
- Passive – 0/5

The Irrigation Options Assessment report identified the following water source opportunities for irrigation:

- Stormwater harvesting
- Recycled water from sewer mining
- Groundwater from onsite bores
- Recycled water from privately operated recycled water schemes

5.1.2 Irrigation rates

Annual Areal Actual Evapotranspiration (Toowoomba) is close to 700mm/yr and 2mm per day (14mm/week). This represents the evapotranspiration which would occur over a large area of land under existing (mean) rainfall conditions.

The images below refer to the average weekly requirements for turf based on the Queensland Government - Efficient irrigation for water conservation: guideline for water efficient urban gardens and landscapes. Calculations determine that the average weekly irrigation demand for the site based on this document is 13.75mm/week (and is quoted to account for various factors

including evapotranspiration). The maximum monthly average is 25mm/week.

Climatic regions	General description of climate	Estimated average irrigation requirements (mm/week) ^{~^}											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
East coast	Predominantly sub-tropical climate, with warm humid summers and mild winters.	20	15	10	5	5	5	5	15	20	20	20	25

* The purpose of this table is to provide a rough guide to the irrigation requirements for turf across Queensland. Actual irrigation requirements, including the volume and frequency of irrigation, will depend on the particular type of plant and its stage of growth, climate characteristics (particularly rainfall and evapotranspiration) and soil type.
[~] The estimation of monthly irrigation requirements has been based on mean monthly rainfall and average areal potential monthly evapotranspiration for each region (from 1961 to 1990) collated from information obtained from the Bureau of Meteorology website. The effective rainfall was assumed to be 75% of the mean monthly rainfall reported. The irrigation requirements are based on a conservative constant crop coefficient of 1, whereas crop coefficients can vary from between 0.1 and 1.1, depending on plant type (e.g. ornamental plant, vegetables, turf or tree) and its stage of growth.
[^] Where the estimated irrigation requirement is zero, it has been determined that no supplementary water irrigation is required based on soil moisture being greater than evaporation for that month.

Figure 6 Extracts from Queensland Government - Efficient irrigation for water conservation: guideline for water efficient urban gardens and landscapes

No allowance has been made for irrigation reductions due to installation of wicking beds. Wicking beds present a future opportunity for irrigation demand reductions in detailed design.

5.2 Irrigation water demand

5.2.1 Irrigation water

Establishment phase

At the completion of earthworks, all disturbed areas are to be immediately revegetated. It is expected that the establishment phase for revegetation will require irrigation over an 8-week period. The irrigation demands during this time is expected to be approximately 30mm/week with an irrigation program similar to that presented in **Table 7**.

Table 7 Irrigation strategy

Action	Growth	Duration
Assuming 1mm of water 4 times per day for seed to keep the top 1cm of soil moist.	germination	2-3 weeks
Once the seed has struck, assume 1 water per day approx 5mm each time to encourage a deeper moisture profile and deep rooting.	until 5-6cm growth	3-5 weeks
Grass can now be cut. Assume 3 water per week at 10mm per occasion. Encourage deeper moisture penetration to 100-150mm again to encourage deep rooting.		4 weeks
Reduce frequency and volume of irrigation to long term management plan based on grass type and climatic conditions.		

Table 8 below shows the water demand during the establishment phase for each stage of the development.

Table 8 Total stage area assuming all disturbed areas topsoiled and seeded or turfed. Based on 30mm per week for 8 weeks.

<i>Stage</i>	<i>Stage area (ha)</i>	<i>ML</i>
Stage 1 - Rectangular fields (Existing Shooting Club and Archery to continue to be managed as existing)	14	33.6
Stage 2 - Archery and Rifle Range	27.2	65.28
Stage 3 - Ovals	11.7	28.08
Stage 4 - Diamond fields and shared fields	19.9	47.76
Stage 5 - Northern rectangular fields	6.8	16.32
Stage 6 -Premier Hub (Stage 1 building, rectangular field and oval, local park)	20.3	48.72
Stage 7 -District park	31.6	75.84

Operational phase

Following establishment phase, the irrigation pattern will further reduce to the longer-term irrigation rates for the various uses within each stage. This assessment has adopted the following irrigation rates after consultation with Toowoomba Regional Council officers. Low and high refer to the rates provided in earlier reports. The maximum rate is based on the maximum monthly average quoted in the Queensland Government - Efficient irrigation for water conservation: guideline for water efficient urban gardens and landscapes.

Table 9 Operational phase irrigation rates

	<i>Irrigation rate (mm/week)</i>		
	<i>Low</i>	<i>High</i>	<i>Maximum</i>
Local	3	7	25
Passive	0	5	15
Regional	5	10	25

Areas within each stage have been measured to identify the areas of playing fields, park and/or landscape areas (refer to **Appendix D**). **Table 10** shows the long-term irrigation demands by stage.

Table 10 Annual irrigation volumes by stage

Irrigation by stage						
Stage	Irrigation area	Area (ha)	Classification	Irrigation demand (ML/year)		
				Based on Otium report		
				Low	High	Max
Stage 1 - Rectangular fields (Existing Shooting Club and Archery to continue to be managed as existing)	Playing area	4	Local	6.2	14.6	52.0
	Landscaping	4.6	Passive	0.0	12.0	35.9
Stage 2 - Archery and Rifle Range	Playing area	2.4	Passive	0.0	6.2	18.7
Stage 3 - Ovals	Playing area	6	Regional	15.6	31.2	78.0
	Landscaping	4.2	Passive	0.0	10.9	32.8
Stage 4 - Diamond fields and shared fields	Playing area	11.4	Local	17.8	41.5	148.2
	Landscaping	5.8	Passive	0.0	15.1	45.2
Stage 5 - Northern rectangular fields	Playing area	3.8	Local	5.9	13.8	49.4
	Landscaping	1.9	Passive	0.0	4.9	14.8
Stage 6 -Premier Hub (Stage 1 building, rectangular field and oval, local park)	Playing area	3.8	Regional	9.9	19.8	49.4
	Landscaping/ Park	6.2	Passive	0.0	16.1	48.4
Stage 7 -District park	Park	3	Passive	0.0	7.8	23.4
Total				55.4	193.9	596.2

5.2.2 Irrigation water supply sources

To meet the full development irrigation demand, the required 24/7 supply rate to meet the low, high and max annual irrigation demand is respectively 1.8, 6.2 and 18.9L/s.

Stormwater harvesting from roof areas will not generate sufficient supply for the purposes of irrigation. Underground storages will be cost prohibitive due to the volumes involved. Surface storages (lakes/dams) have previously been considered and Toowoomba Regional Council have advised this option is no longer being considered for the development.

Stormwater capture from roof areas for dual reticulation plumbing to amenities (i.e. toilet flushing) and outside taps may be appropriate. This can be considered in further detailed design.

It is improbable that groundwater bores will be able to provide the maximum volume required for the development (i.e. based on a 24/7 continuous draw of 1.5L/s, the maximum annual volume would be 47ML). However, it may be considered as the supply source during Stage 1 and 2 based on a "high" rate of irrigation. Depending on the depth of the bores and the aquifer accessed, reliability issues could be encountered due to the continuous draw. The water quality will also require further assessment to determine if it is suitable for irrigation.

Recycled water alternatives from privately operated recycled water schemes were considered. These sources are understood to be Class A (Acland pipeline) and Class C (Millmerran pipeline) recycled water.

Class A recycled water is suitable for irrigation on public access areas.

If Class C recycled water is used, further treatment onsite will be required to improve the quality of water suitable for irrigation on public access areas (i.e. Class A). The treatment will require a management plan, establishment of infrastructure, and maintenance. The required 24/7 treatment rate to meet the max annual irrigation demand is 19.2L/s. This infrastructure is expected to be costly to establish and operate.

Sewer mining will require a higher level of treatment than water sourced from the privately operated recycled water schemes. No further consideration of that option is provided in this report on that basis.

Due to the volume of irrigation water required, the most viable source is likely to be a recycled water supply from Wetalla advanced wastewater treatment plant (subject to Toowoomba Regional Council contract commitments). This supply is expected to be able to meet the volumetric requirements of the development as well as the Class A water quality requirements for public health. Although the Class A recycled water will meet the water quality requirements for public health, the water quality should be confirmed suitable for the intended use – irrigation.

Refer to Irrigation Options Assessment Report 2022 by RMA for further details and confirmation of a dedicated recycled water supply pipeline from Wetalla advanced wastewater treatment plant as the preferred option.

As recycled water is the only water source than can meet the irrigation demand of the TRSP, RMA recommends that Council undertake a feasibility study and corridor study to determine the best alignment.

6. Conclusion

RMA Engineers (RMA) have been engaged by Toowoomba Regional Council to further develop the water and sewer requirements of the proposed Toowoomba Region Sports Precinct (TRSP) for the purposes of supporting a Local Government Infrastructure Designation (LGID) process.

As a result of the investigations into sewer and water requirements we have found that:

- There are many options available for the management of wastewater with the preferred management option being a gravity service to the sewer network west of the development site (initially the Nass Road temporary sewage pumping station (subject to available capacity) and longer term to the Draper St sewage pumping station).
- Potable water supply can be provided to service the proposed development from the existing water network to the east. Fire fighting provisions will be subject to achievement of the required flow and pressures. If it is found that the network cannot support this demand, onsite provision can be employed to provide this service requirement.
- There are many options available for irrigation water supply with the preferred option being recycle water supply from Wetalla advanced wastewater treatment plant.

Based on the above, the developments requirements for water supply and sewer management can be provided enabling development of the Toowoomba Region Sports Precinct.

Appendix A Toowoomba Recreation Sports Precinct usage analysis data

Typical Winter Usage Schedule

Day	Activity	Time																People		Vehicles
		0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100			
Monday	Athletics	12	12	6	0	0	0	0	0	0	0	6	12	6	0	0	0	54	22	
	Recreation	0	0	2	8	12	12	12	8	6	2	8	8	6	0	0	0	84	34	
	Premier Oval	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Premier Rectangle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Rugby League/ Union	0	0	0	0	0	0	0	0	0	0	10	120	120	120	120	120	620	248	
	Soccer A	0	0	0	0	0	0	0	0	0	0	10	100	100	100	100	100	520	208	
	Soccer B	0	0	0	0	0	0	0	0	0	0	10	100	100	100	100	100	520	208	
	Ovals	0	0	0	0	0	0	0	0	0	0	10	120	120	90	90	60	500	200	
	Softball/ Baseball	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Netball	0	0	0	0	0	0	0	0	0	0	10	240	240	240	120	0	850	340	
	People Sub-total	12	12	8	8	12	12	12	8	6	52	694	700	662	530	380	40	3148		
Vehicles Sub-total	5	5	3	3	5	5	5	3	2	21	278	280	265	212	152	16		1259		
Tuesday	Athletics	12	12	6	0	0	0	0	0	0	0	6	12	6	0	0	0	54	22	
	Recreation	0	0	2	8	12	12	12	8	6	2	8	8	6	0	0	0	84	34	
	Premier Oval	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Premier Rectangle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Rugby League/ Union	0	0	0	0	0	0	0	0	0	0	10	120	120	120	120	120	620	248	
	Soccer A	0	0	0	0	0	0	0	0	0	0	10	100	100	100	100	100	520	208	
	Soccer B	0	0	0	0	0	0	0	0	0	0	10	100	100	100	100	100	520	208	
	Ovals	0	0	0	0	0	0	0	0	0	0	10	120	120	90	90	60	500	200	
	Softball/ Baseball	0	0	0	0	0	0	0	0	0	0	0	55	55	55	30	0	195	78	
	Netball	0	0	0	0	0	0	0	0	0	0	10	240	240	240	120	0	850	340	
	People Sub-total	12	12	8	8	12	12	12	8	6	52	749	755	717	560	380	40	3343		
Vehicles Sub-total	5	5	3	3	5	5	5	3	2	21	300	302	287	224	152	16		1337		
Wednesday	Athletics	12	12	6	0	0	0	0	0	0	0	6	12	6	0	0	0	54	22	
	Recreation	0	0	2	8	12	12	12	8	6	2	8	8	6	0	0	0	84	34	
	Premier Oval	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Premier Rectangle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Rugby League/ Union	0	0	0	0	0	0	0	180	180	10	120	120	120	120	120	10	980	392	
	Soccer A	0	0	0	0	0	0	0	120	120	10	100	100	100	100	100	10	760	304	
	Soccer B	0	0	0	0	0	0	0	120	120	10	100	100	100	100	100	10	760	304	
	Ovals	0	0	0	0	0	0	0	90	90	10	120	120	90	90	60	10	680	272	
	Softball/ Baseball	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Netball	0	0	0	0	0	0	0	0	0	0	10	240	240	240	120	0	850	340	
	People Sub-total	12	12	8	8	12	12	12	518	516	52	694	700	662	530	380	40	4168		
Vehicles Sub-total	5	5	3	3	5	5	5	207	206	21	278	280	265	212	152	16		1667		
Thursday	Athletics	12	12	6	0	0	0	0	0	0	0	6	12	6	0	0	0	54	22	
	Recreation	0	0	2	8	12	12	12	8	6	2	8	8	6	0	0	0	84	34	
	Premier Oval	0	0	0	0	0	0	0	0	0	0	0	30	30	30	30	10	130	52	
	Premier Rectangle	0	0	0	0	0	0	0	0	0	0	0	30	30	30	30	10	130	52	
	Rugby League/ Union	0	0	0	0	0	0	0	0	0	0	10	120	120	120	120	120	620	248	
	Soccer A	0	0	0	0	0	0	0	0	0	0	10	100	100	100	100	100	520	208	
	Soccer B	0	0	0	0	0	0	0	0	0	0	10	100	100	100	100	100	520	208	
	Ovals	0	0	0	0	0	0	0	0	0	0	10	120	120	90	90	60	500	200	
	Softball/ Baseball	0	0	0	0	0	0	0	0	0	0	0	55	55	55	30	0	195	78	
	Netball	0	0	0	0	0	0	0	0	0	0	10	240	240	240	120	0	850	340	
	People Sub-total	12	12	8	8	12	12	12	8	6	52	749	815	777	620	440	60	3603		
Vehicles Sub-total	5	5	3	3	5	5	5	3	2	21	300	326	311	248	176	24		1441		
Friday	Athletics	12	12	6	0	0	0	0	0	0	0	6	12	6	0	0	0	54	22	
	Recreation	0	0	2	8	12	12	12	8	6	2	8	8	6	0	0	0	84	34	
	Premier Oval	0	0	0	0	0	0	0	0	0	0	70	120	120	120	120	70	620	248	
	Premier Rectangle	0	0	0	0	0	0	0	0	0	0	60	105	105	105	105	60	540	216	
	Rugby League/ Union	0	0	0	0	0	0	0	180	180	10	120	120	120	120	120	10	980	392	
	Soccer A	0	0	0	0	0	0	0	120	120	10	240	240	240	240	240	60	1510	604	
	Soccer B	0	0	0	0	0	0	0	120	120	10	240	240	240	240	240	60	1510	604	
	Ovals	0	0	0	0	0	0	0	90	90	10	120	120	90	90	60	10	680	272	
	Softball/ Baseball	0	0	0	0	0	0	0	0	0	0	60	105	105	105	60	0	435	174	
	Netball	0	0	0	0	0	0	0	0	0	0	10	240	240	240	240	120	1330	532	
	People Sub-total	12	12	8	8	12	12	12	518	516	52	1164	1310	1272	1260	1185	390	7743		
Vehicles Sub-total	5	5	3	3	5	5	5	207	206	21	466	524	509	504	474	156		3097		
Saturday	Athletics	0	0	6	12	12	6	2	2	2	2	6	12	6	0	0	0	68	27	
	Recreation	0	2	10	20	28	28	28	28	28	20	10	10	2	0	0	0	214	86	
	Premier Oval	0	0	10	70	120	120	120	120	120	120	120	120	120	120	70	0	1350	540	
	Premier Rectangle	0	0	10	60	105	105	105	105	105	105	105	105	105	105	60	0	1180	472	
	Rugby League/ Union	0	10	60	360	360	360	360	270	270	270	270	270	270	270	180	60	3640	1456	
	Soccer A	0	0	30	240	240	240	240	240	240	240	240	240	240	240	180	60	2670	1068	
	Soccer B	0	0	30	240	240	240	240	240	240	240	240	240	240	240	180	60	2670	1068	
	Ovals	0	0	10	120	150	150	120	80	80	80	80	80	80	80	40	0	1150	460	
	Softball/ Baseball	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Netball	0	0	10	720	720	720	720	540	540	540	360	180	60	0	0	0	5110	2044	
	People Sub-total	0	12	176	1842	1975	1969	1935	1625	1625	1617	1431	1257	1123	935	470	60	18052		
Vehicles Sub-total	0	5	70	737	790	788	774	650	650	647	572	503	449	374	188	24		7221		
Sunday	Athletics	0	0	6	12	12	6	2	2	2	6	12	6	0	0	0	0	68	27	
	Recreation	0	2	10	20	28	28	28	28	28	20	10	10	2	0	0	0	214	86	
	Premier Oval	0	0	10	70	120	120	120	120	120	120	120	120	120	70	0	0	1230	492	
	Premier Rectangle	0	0	10	60	105	105	105	105	105	105	105	105	105	60	0	0	1075	430	
	Rugby League/ Union	0	10	60	360	360	360	360	270	270	270	270	270	270	180	60	0	2830	1132	
	Soccer A	0	0	30	240	240	240	240	240	240	240	240	240	240	180	60	0	2430	972	
	Soccer B	0	0	30	240	240	240	240	240	240	240	240	240	240	180	60	0	2430	972	
	Ovals	0	0	10	80	80	80	80	80	80	80	80	80	80	40	0	0	850	340	
	Softball/ Baseball	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Netball	0	0	0	0	0	0	0												

Typical Summer Usage Schedule

Day	Activity	Time																People		Vehicles
		0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100			
Monday	Athletics	18	18	12	0	0	0	0	0	0	0	12	18	12	6	0	0	96	38	
	Recreation	0	0	3	12	18	18	18	12	9	3	12	12	9	0	0	0	126	50	
	Premier Oval	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Premier Rectangle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Rugby League/ Union	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Soccer A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Soccer B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Ovals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Softball/ Baseball	0	0	0	0	0	0	0	0	0	0	30	40	40	40	30	0	180	72	
	Netball	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	People Sub-total	18	18	15	12	18	18	18	12	9	3	54	70	61	46	30	0	402		
	Vehicles Sub-total	7	7	6	5	7	7	7	5	4	1	22	28	24	18	12	0		161	
Tuesday	Athletics	18	18	12	0	0	0	0	0	0	0	12	18	12	6	0	0	96	38	
	Recreation	0	0	3	12	18	18	18	12	9	3	12	12	9	0	0	0	126	50	
	Premier Oval	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Premier Rectangle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Rugby League/ Union	0	0	0	0	0	0	0	0	0	10	70	70	70	70	70	10	370	148	
	Soccer A	0	0	0	0	0	0	0	0	0	10	70	70	70	70	70	10	370	148	
	Soccer B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Ovals	0	0	0	0	0	0	0	0	0	10	90	90	70	70	40	10	380	152	
	Softball/ Baseball	0	0	0	0	0	0	0	0	0	0	100	100	100	60	0	0	360	144	
	Netball	0	0	0	0	0	0	0	0	0	10	80	80	80	60	0	0	310	124	
	People Sub-total	18	18	15	12	18	18	18	12	9	43	434	440	411	336	180	30	2012		
	Vehicles Sub-total	7	7	6	5	7	7	7	5	4	17	174	176	164	134	72	12		805	
Wednesday	Athletics	18	18	12	0	0	0	0	0	0	0	12	18	12	6	0	0	96	38	
	Recreation	0	0	3	12	18	18	18	12	9	3	12	12	9	0	0	0	126	50	
	Premier Oval	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Premier Rectangle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Rugby League/ Union	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Soccer A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Soccer B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Ovals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Softball/ Baseball	0	0	0	0	0	0	0	0	0	0	30	40	40	40	30	0	180	72	
	Netball	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	People Sub-total	18	18	15	12	18	18	18	12	9	43	434	440	411	336	180	30	2012		
	Vehicles Sub-total	7	7	6	5	7	7	7	5	4	17	174	176	164	134	72	12		805	
Thursday	Athletics	18	18	12	0	0	0	0	0	0	0	12	18	12	6	0	0	96	38	
	Recreation	0	0	3	12	18	18	18	12	9	3	12	12	9	0	0	0	126	50	
	Premier Oval	0	0	0	0	0	0	0	0	0	0	0	30	30	30	30	10	130	52	
	Premier Rectangle	0	0	0	0	0	0	0	0	0	0	0	30	30	30	30	10	130	52	
	Rugby League/ Union	0	0	0	0	0	0	0	0	0	10	70	70	70	70	70	10	370	148	
	Soccer A	0	0	0	0	0	0	0	0	0	10	70	70	70	70	70	10	370	148	
	Soccer B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Ovals	0	0	0	0	0	0	0	0	0	10	90	90	70	70	40	10	380	152	
	Softball/ Baseball	0	0	0	0	0	0	0	0	0	0	100	100	100	60	0	0	360	144	
	Netball	0	0	0	0	0	0	0	0	0	10	80	80	80	60	0	0	310	124	
	People Sub-total	18	18	15	12	18	18	18	12	9	43	434	500	471	396	240	50	2272		
	Vehicles Sub-total	7	7	6	5	7	7	7	5	4	17	174	200	188	158	96	20		909	
Friday	Athletics	18	18	12	0	0	0	0	0	0	0	60	90	120	120	90	10	538	215	
	Recreation	0	0	3	12	18	18	18	12	9	3	15	15	12	9	0	0	144	58	
	Premier Oval	0	0	0	0	0	0	0	0	0	0	50	85	85	85	85	50	440	176	
	Premier Rectangle	0	0	0	0	0	0	0	0	0	0	40	70	70	70	70	40	360	144	
	Rugby League/ Union	0	0	0	0	0	0	0	90	90	10	70	70	70	70	70	10	550	220	
	Soccer A	0	0	0	0	0	0	0	60	60	10	120	120	120	120	120	60	790	316	
	Soccer B	0	0	0	0	0	0	0	120	120	10	240	240	240	240	240	60	1510	604	
	Ovals	0	0	0	0	0	0	0	0	0	0	10	120	120	120	60	0	430	172	
	Softball/ Baseball	0	0	0	0	0	0	0	0	0	0	60	130	130	130	60	0	510	204	
	Netball	0	0	0	0	0	0	0	0	0	10	60	80	80	80	60	0	370	148	
	People Sub-total	18	18	15	12	18	18	18	282	279	43	725	1020	1047	1044	855	230	5642		
	Vehicles Sub-total	7	7	6	5	7	7	7	113	112	17	290	408	419	418	342	92		2257	
Saturday	Athletics	0	0	12	60	90	120	120	90	60	0	0	0	0	0	0	0	552	221	
	Recreation	2	4	20	40	56	56	56	56	56	40	20	20	4	0	0	0	430	172	
	Premier Oval	0	0	10	40	90	90	90	90	90	90	90	90	90	90	40	0	990	396	
	Premier Rectangle	0	0	10	40	85	85	85	85	85	85	85	85	85	85	40	0	940	376	
	Rugby League/ Union	0	10	60	120	120	120	120	120	120	120	120	120	120	120	60	0	1570	628	
	Soccer A	0	0	30	120	120	120	120	120	120	120	120	120	120	120	60	0	1410	564	
	Soccer B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Ovals	0	0	10	90	120	120	120	120	120	120	120	120	120	120	40	0	1340	536	
	Softball/ Baseball	0	10	60	80	130	130	130	130	130	130	130	60	0	0	0	0	1250	500	
	Netball	0	0	10	60	80	80	80	80	80	80	80	80	60	0	0	0	770	308	
	People Sub-total	2	24	222	650	891	921	921	891	861	785	765	765	659	535	300	60	9252		
	Vehicles Sub-total	1	10	89	260	356	368	356	344	314	306	306	264	214	120	24		3701		
Sunday	Athletics	0	0	0	18	18	12	12	12	12	12	6	0	0	0	0	0	114	46	
	Recreation	2	4	20	40	56	56	56	56	56	40	20	20	4	0	0	0	430	172	
	Premier Oval	0	0	10	40	90	90	90	90	90	90	90	90	90	40	0	0	900	360	
	Premier Rectangle	0	0	10	40	85	85	85	85	85	85	85	85	85	40	0	0	855	342	
	Rugby League/ Union	0	10	60	120	120	120	120	120	120	120	120	120	60	0	0	0	1210	484	
	Soccer A	0	0	30	120	120	120	120	120	120	120	120	120	120	60	0	0	1290	516	
	Soccer B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Ovals	0	0	10	90	120	120	120	120	120	120	120	120	120	40	0	0	1220	488	
	Softball/ Baseball	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Netball	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	People Sub-total	2	14	140	468	609	603	603	603	603	587	567	561	479	180	0	0	6019		
	Vehicles Sub-total	1	6	56	187															

Typical Events Usage Schedule

Event Type	# Events P.A.	# Event Days P.A.	Avg. Persons Per Event Day	Total Persons Per Event Year	Avg. Vehicles Per Event Day	Total Vehicles Per Event Year
Regular Community Events	50	52	500	26000	200	10400
Major Events	13	16	1500	24000	600	9600
One Off Events	4	7	3000	21000	1200	8400
Sport / Fitness Events	24	48	700	33600	280	13440
TOTAL / AVERAGE	91	123	1425	71000	570	28400

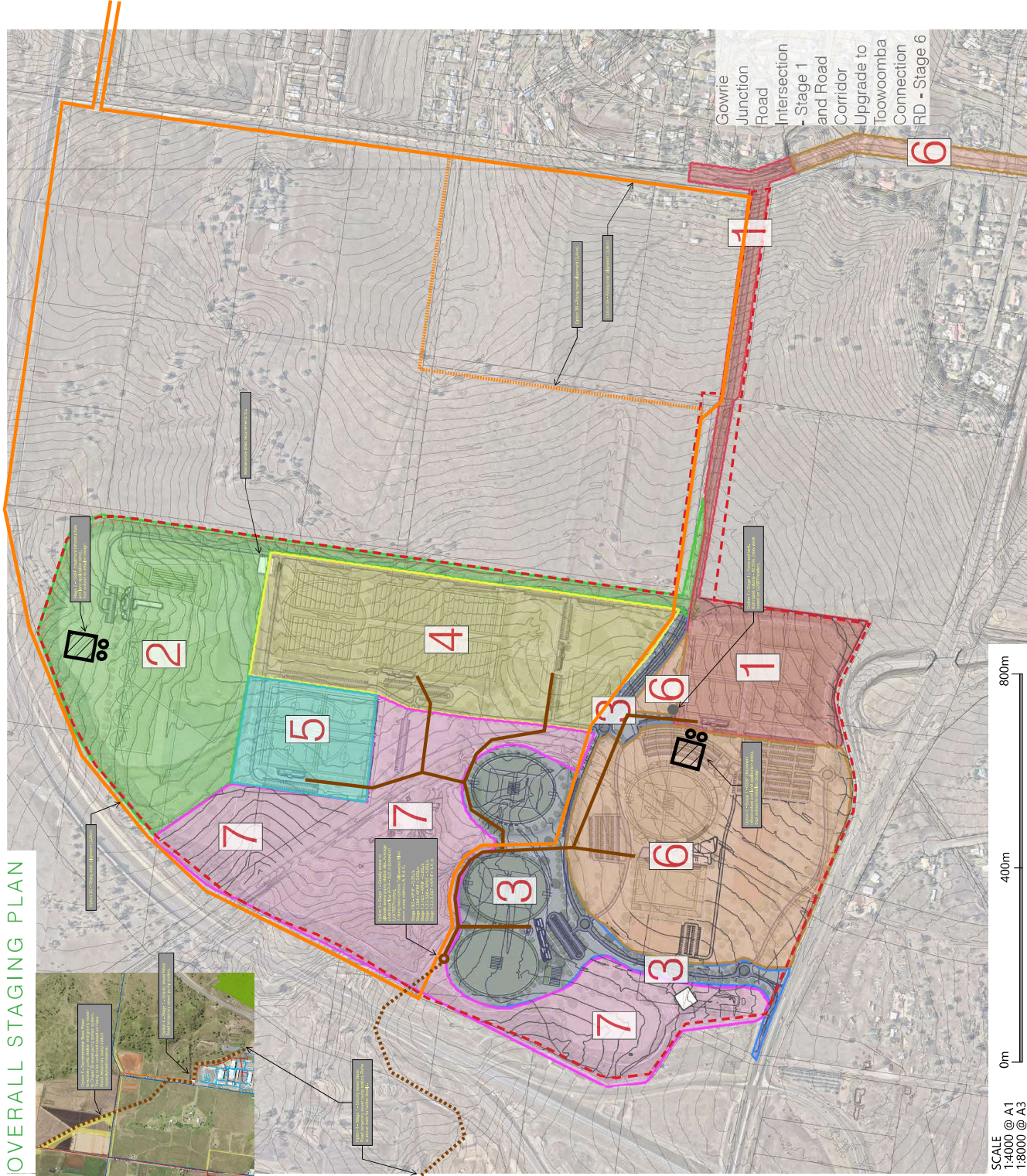
Appendix B Sewage management options

Appraisal of concept sewer servicing options for Toowoomba Regional Sports Precinct

19/11/2021

Option 1 - Pump out system		Option 2 - OSSF		Option 3 - SPS		Option 4/5 - Gravity feed to Nass Road	
Staging Stage 1	Pump out tank for rectangular fields	Staging Stage 1	Construct treatment system and land application area (OSSF) for rectangular fields	Staging Stage 1	Construct gravity sewer to ultimate sewer pump station location for rectangular fields	Staging Stage 1	Construct gravity sewer to Nass Road temporary SPS
	Existing on-site sewerage facility (OSSF) to existing rifle range		Ongoing OSSF operation for rectangular fields		Construct sewer rising main to Tallowood Blvd SPS - approx 3km		Underbore Warrego Hwy
Stage 2	Ongoing pump out tank operation for rectangular fields	Stage 2	Ongoing OSSF operation for rectangular fields		Existing on-site sewerage facility (OSSF) to existing rifle range	Stage 2	Existing on-site sewerage facility (OSSF) to existing rifle range
	New OSSF system to new rifle range		New OSSF system to new rifle range		Ongoing gravity sewer and SPS operation for rectangular fields		Ongoing gravity sewer operation for rectangular fields
	Decommission treatment system/rehabilitate existing land application area for old rifle range		Decommission treatment system/rehabilitate existing land application area for old rifle range		New OSSF system to new rifle range		New OSSF system to new rifle range
Stage 3	Oval fields new gravity sewer to Sewage Pumping Station (SPS)	Stage 3	Oval fields new gravity sewer to SPS		Decommission treatment system/rehabilitate existing land application area for old rifle range		Decommission treatment system/rehabilitate existing land application area for old rifle range
	Gravity sewer extension to rectangular fields, decommission pump out tank		Gravity sewer extension to rectangular fields, decommission treatment system and rehabilitate land application area		Gravity network extension to all future stages. Some pump upgrades may be necessary over time. Athletic and Netball may require small SPS systems due to site topography.	Stage 3 on	Gravity network extension to all future stages. Some pump upgrades may be necessary over time. Athletic and Netball may require small SPS systems due to site topography.
Stage 4 on	Ongoing OSSF operation for rifle range		Ongoing OSSF operation for rifle range		Ongoing OSSF operation for rifle range	Stage TBC	Ongoing OSSF operation for rifle range
	Gravity network extension to all future stages. Some pump upgrades may be necessary over time. Athletic and Netball may require small SPS systems due to site topography.		Gravity network extension to all future stages. Some pump upgrades may be necessary over time. Athletic and Netball may require small SPS systems due to site topography.		Gravity network extension to all future stages. Some pump upgrades may be necessary over time. Athletic and Netball may require small SPS systems due to site topography.		Gravity network extension to all future stages. Some pump upgrades may be necessary over time. Athletic and Netball may require small SPS systems due to site topography.
Estimated comparative establishment cost \$80k	10,000L holding tank	Estimated comparative establishment cost \$25k	Domestic scale treatment plant (approx 2,000L/day, likely bigger required)	Estimated comparative establishment cost \$450k	Sewer rising main	Estimated comparative establishment cost \$100k	Underbore TSCR
		\$65k	30,000L buffer tank	\$500k	SPS	\$300k	Gravity sewer
		\$50k	200m ² LAA	\$200k	Gravity sewer		
Pros	Simple system, no moving parts.	Pros	Operational reliance on truck out management reduced. May be more suitable than option 1 if project does not progress to Stage 3 for more than 18 months.	Pros	Operation and maintenance of SPS familiar to TRC (assumes managed by TRC Water and Waste Dept not Parks and Recreation Dept)	Pros	Management of SPS systems familiar to TRC staff
					Wet well size and pump selection can be sized to deal with fluctuations in effluent rates		Reduced risk of system overflow
					Reduced risk of system overflow		Aligns with TRC long term sewer strategies
Cons		Cons			\$200k of gravity sewer costs are a bring forward cost from stage 3 where it is expected the gravity sewer would otherwise be required.		Lowest overall operational cost
	Ongoing performance monitoring and monitoring of storage levels/volumes (poor feedback from Highfields facility experience)		Irregular loading and peak loading could require an oversized system and result in poor system performance				Timing of sewer inflows expected to align with off peak operational times of TRC depot
	Cost to manage effluent		Maintenance cost	Cons	Establishment costs of SPS and rising main(s)		Wastewater quality issues avoided
	Long storage times requiring odour and effluent quality management		Tank/s and treatment infrastructure decommissioning cost				Detention times in rising main from Nass Road benefited from additional inflow.
	Temporary solution only that is not suitable if project does not progress to Stage 3 within 12-18 months		Land application area decommissioning cost		SPS operational costs		\$200k of gravity sewer costs are a bring forward cost from stage 3 where it is expected the gravity sewer would otherwise be required.
			Stage 1 ERA03 permit required - Estimated patrons of rectangular fields - Peak day, Winter, Sunday - 2670 visitors, loading 0.05EP/person (WSA4402 2014 Appendix B) = 133.5EP		Detention times in system/rising main (magnesium hydroxide dosing required)	Cons	
					Long periods of no load will affect wastewater quality		
					Potentially multiple rising main sizes required to cope with staging.		Sewer crossing TSCR (identified by TRC Water and Waste as a potential issue, not considered major)
							Upfront investment cost if trunk gravity main required downstream
							Subject to Nass Road temporary SPS capacity, upgrade may be
Issues to be confirmed	Likely timing of progress through Stages 1-3	Issues to be confirmed	Likely timing of progress through Stages 1-3	Issues to be confirmed		Issues to be confirmed	
			System design and operational expectations to be confirmed. Wide potential operating range could result in likely under or oversized system. Actual cost depend on system installed. Note a larger treatment system will not necessarily result in better performance.				Nass Road Temporary SPS capacity to accept staging of TRSP.
							Timing of trunk gravity upgrades downstream of temporary SPS.

OVERALL STAGING PLAN



STAGING SEQUENCE

- Stage 1**
Southern rectangular fields, clubhouse, parking, access road boulevard to be south side only leading to Gowrie Junction Road intersection. Existing shooting club and archery to remain.
- Stage 2**
Relocation of shooting club and archery, indoor range, shared clubhouse, parking and access road. Construct roundabout and northern side of boulevard road. Provide access to Toowoomba Connection Rd.
- Stage 3**
Ovals, practice nets, clubhouse, parking and road access.
- Stage 4**
Diamond Fields, rectangular fields, shared fields, clubhouses, parking and access roads.
- Stage 5**
Northern rectangular fields, clubhouse and parking.
- Stage 6**
Premier Hub, premier oval, premier rectangular field, parking and access roads. Local park and playground north of southern soccer fields and construct north side of boulevard road.
Potential upgrade to Gowrie Junction Road to Toowoomba Connection Road.
- Stage 7**
District Park and facilities including parking, access, playground and stormwater treatment channels.

SCALE
1:4000 @ A1
1:8000 @ A3

TOOWOOMBA REGION SPORTS PRECINCT

2020 MASTER PLAN

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SCALE AS SHOWN @ A1
DRAWING DC-34 [0]
PROJECT 19009
DATE 26-05-2022

CLIENT:
TOOWOOMBA REGION
CONSULTANTS:



LEAD CONSULTANT:
OTIUM
SPORT + LEISURE
Landscape Architecture Urban design Master Planning Environmental

open architecture studio

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Appendix C Conceptual clubhouse details

PREMIER PRECINCT PLAN STAGE 06 - AXONOMETRIC

stage 06

multi-purpose rooms, amenities, gym,
change rooms and umpire rooms

oval field terraced seating

rectangular field
terraced seating

entry to premier hub
from eastern carpark

premier oval field

entry to premier hub
from western carpark

premier rectangular field

entry to premier hub
from north

change room entry

TOOWOOMBA REGION SPORTS PRECINCT DETAILED CONCEPT

Open Architecture Studio, 12/371 Queen St, Brisbane 4000 T. 0400 723 775 E. michael@openarchitecture.studio www.openarchitecture.studio

SCALE AS SHOWN @A1

DRAWING DC&I [J]

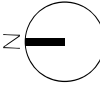
PROJECT 19009

DATE 26.08.2020

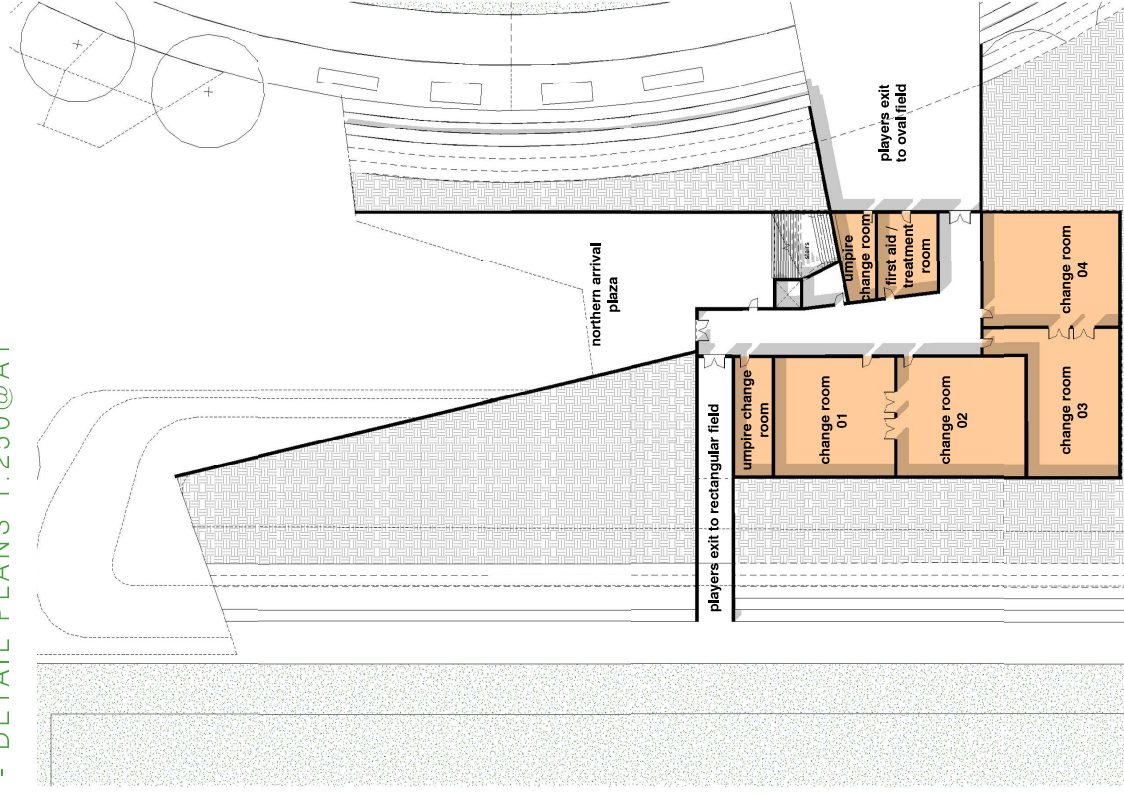
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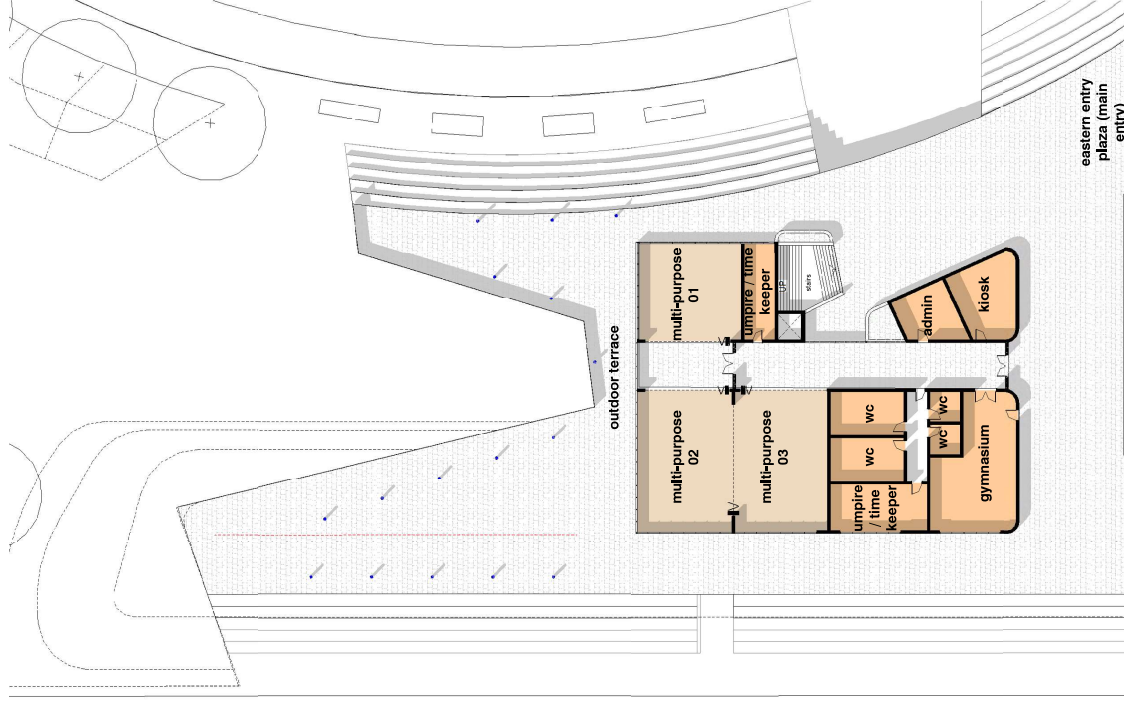
LEAD CONSULTANT:



PREMIER PRECINCT PLAN
STAGE 06 - DETAIL PLANS 1:250@A1



stage 06
playing fields level

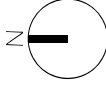


stage 06
concourse level

TOOWOOMBA REGION SPORTS PRECINCT
DETAILED CONCEPT

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SCALE AS SHOWN @A1
DRAWING DCAS [J]
PROJECT 19009
DATE 26.08.2020



CLIENT:



LEAD CONSULTANT:



CONSULTANTS:



SITE PLAN NORTH - LOCATION OF CLUBHOUSES

1:2000 @ A1



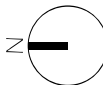
Club Houses



TOOWOOMBA REGION SPORTS PRECINCT

DETAILED CONCEPT

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SCALE AS SHOWN @ A1

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PROJECT 19009
DATE 26.08.2020

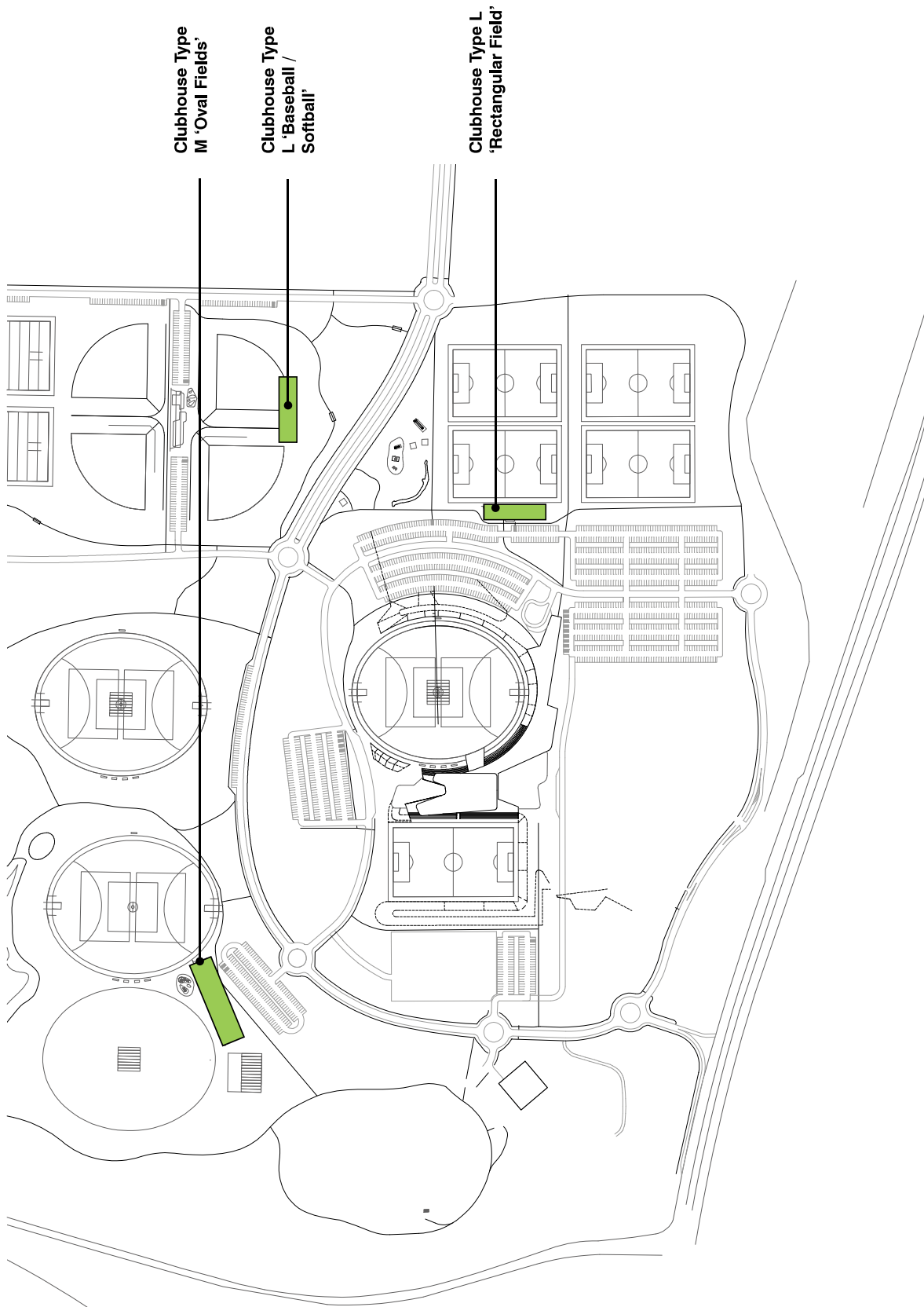
LEAD CONSULTANT:



CONSULTANTS:



SITE PLAN SOUTH - LOCATION OF CLUBHOUSES 1:2000 @ A1



TOOWOOMBA REGION SPORTS PRECINCT DETAILED CONCEPT

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DRAWING: DC-05 [J]
PROJECT: 19009
DATE: 26.08.2020

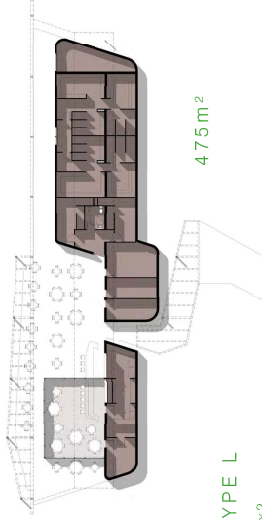
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LEAD CONSULTANT:



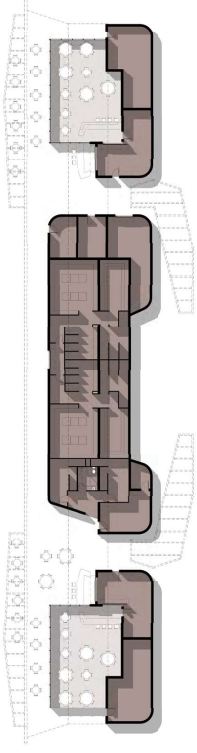
CLUBHOUSES TYPES L, M, N, & O



475m²

CLUBHOUSE TYPE L

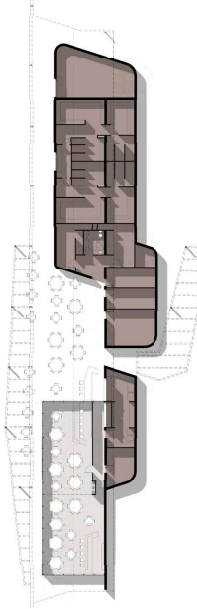
Rectangular Fields x2.
Baseball/Soccer



857m²

CLUBHOUSE TYPE M

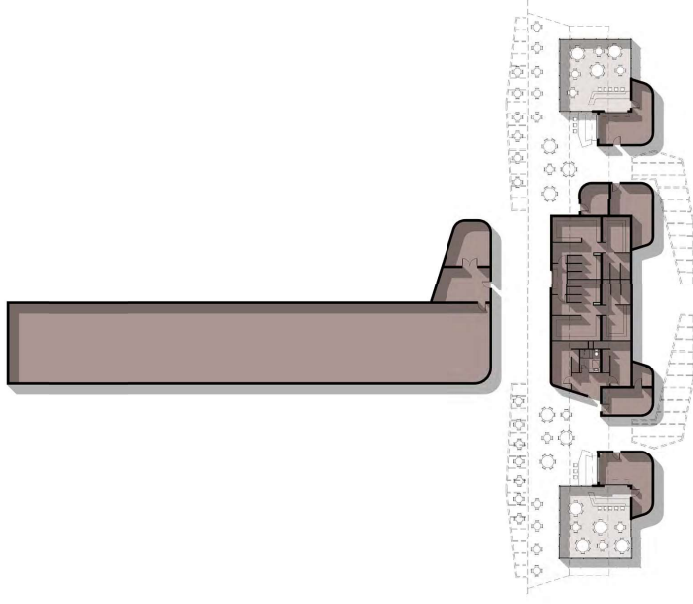
Oval Fields



590m²

CLUBHOUSE TYPE O

Rectangular Fields x 1



CLUBHOUSE TYPE N 630m² + 653m² indoor shooting range

Shared - Archery / Shooting

TOOWOOMBA REGION SPORTS PRECINCT DETAILED CONCEPT

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SCALE / AS SHOWN @ 1:1
DRAWING DC-87 [J]
PROJECT / 19009
DATE / 26.08.2020

CLIENT:



LEAD CONSULTANT:

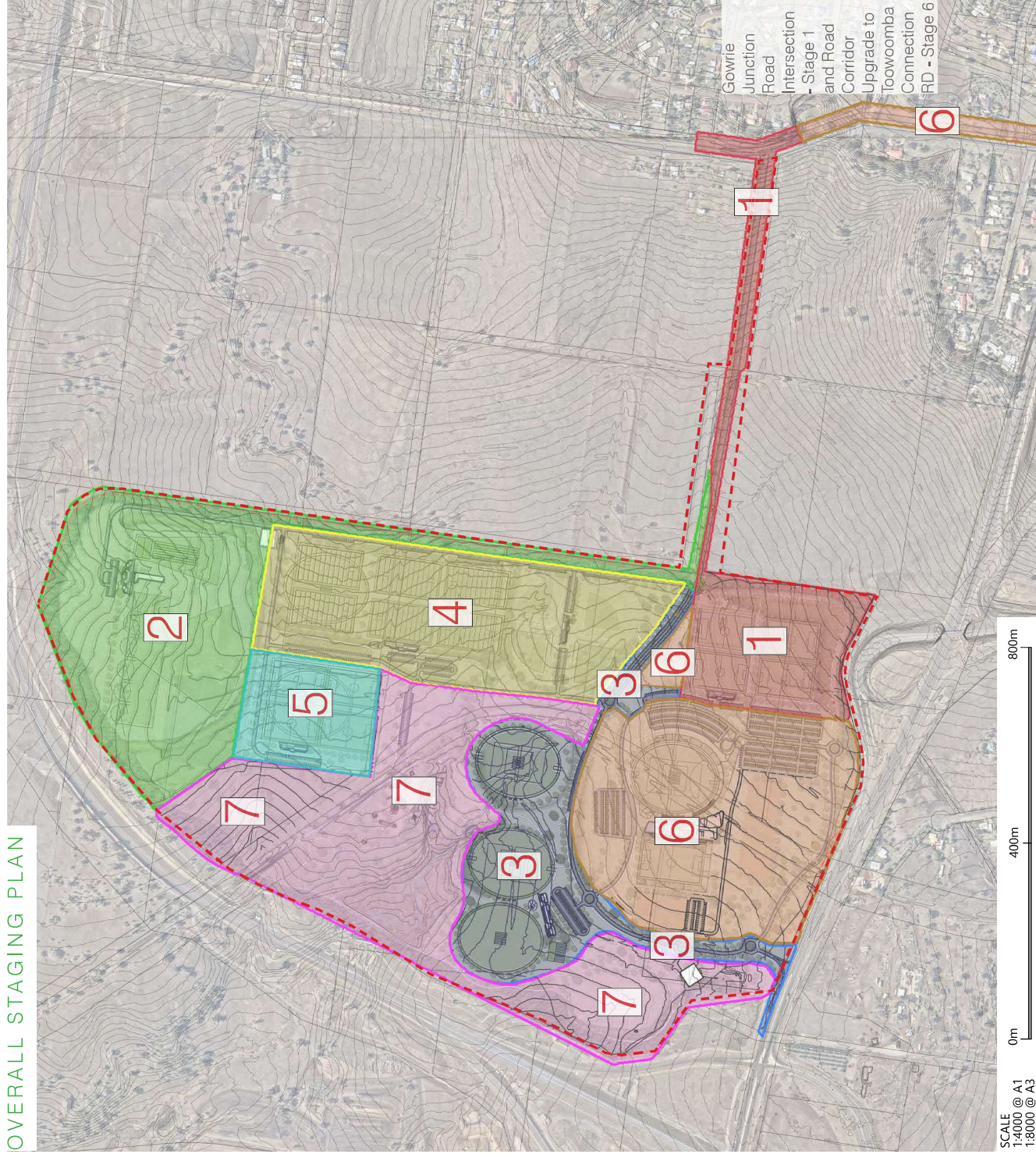


CONSULTANTS:



Appendix D Irrigation areas by stage

OVERALL STAGING PLAN

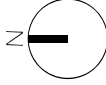


SCALE
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1:8000 @ A3

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LEAD CONSULTANT:



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STAGING SEQUENCE

Stage 1

Southern rectangular fields, clubhouse, parking, access road boulevard to be south side only leading to Gowrie Junction Road intersection. Existing shooting club and archery to remain.

Stage 2

Relocation of shooting club and archery, indoor range, shared clubhouse, parking and access road. Construct roundabout and northern side of boulevard road. Provide access to Toowoomba Connection Rd.

Stage 3

Ovals, practice nets, clubhouse, parking and road access.

Stage 4

Diamond Fields, rectangular fields, shared fields, clubhouses, parking and access roads.

Stage 5

Northern rectangular fields, clubhouse and parking.

Stage 6

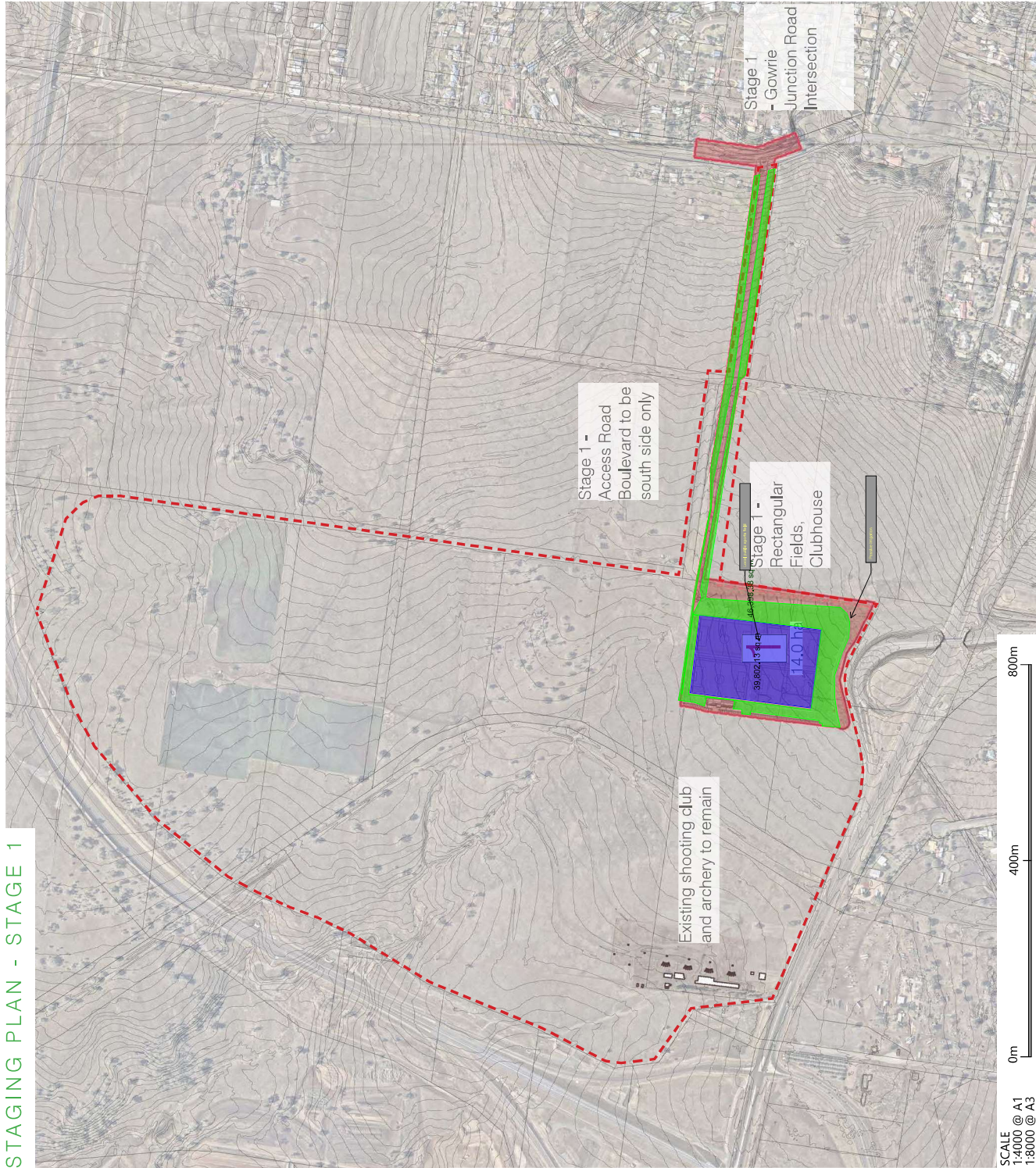
Premier Hub, premier oval, premier rectangular field, parking and access roads. Local park and playground north of southern soccer fields and construct north side of boulevard road.

Potential upgrade to Gowrie Junction Road to Toowoomba Connection Road.

Include Entry Parkland, Southern and Northern Setdown areas and overflow parking areas

Stage 7

District Park and facilities including parking, access, playground and stormwater treatment channels.



SCALE
1:4000 @ A1
1:8000 @ A3

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SCALE AS SHOWN (8:1)
DRAWING DC-35 (D)
PROJECT 19009
DATE 26-05-2022

CLIENT:



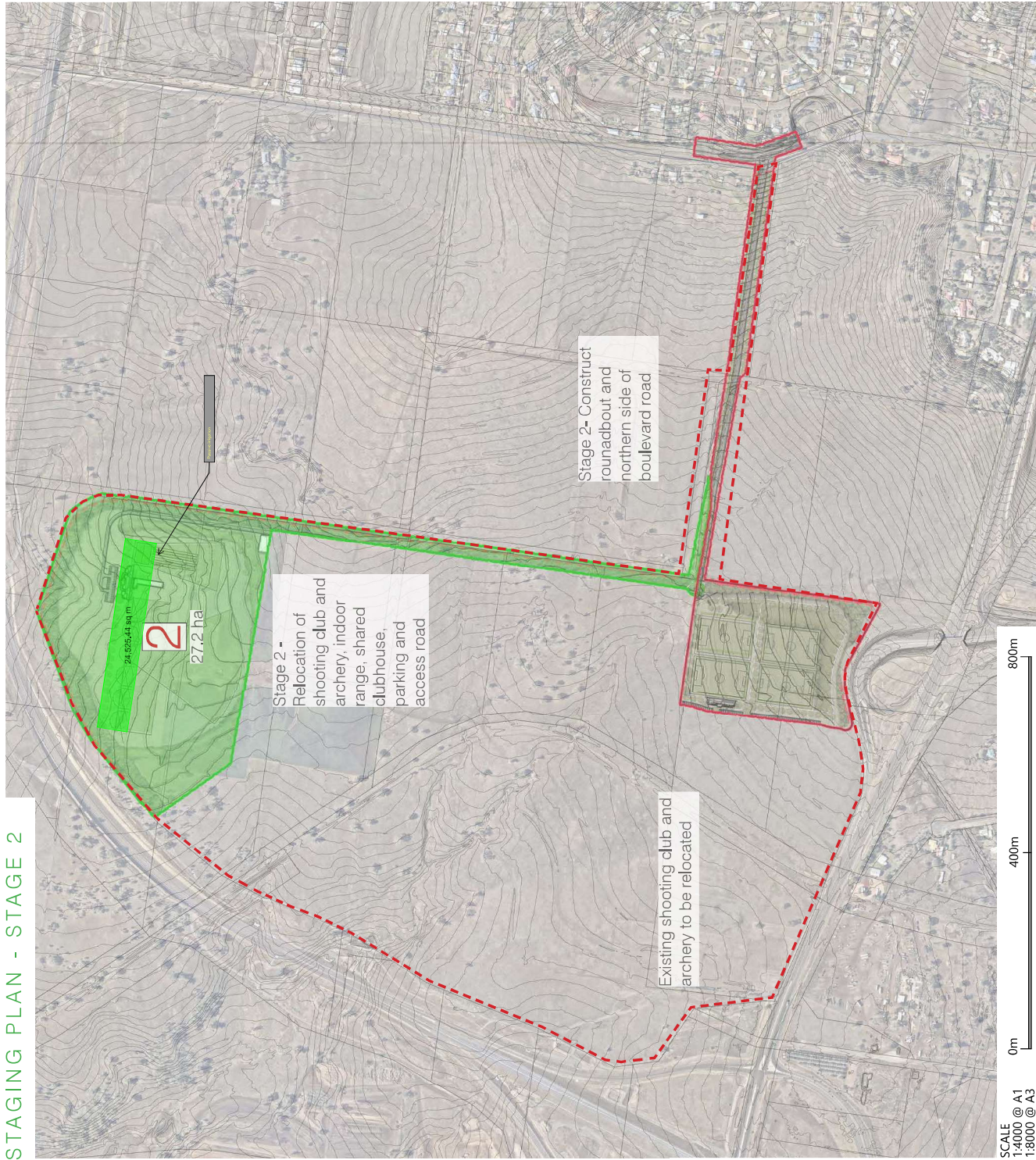
CONSULTANTS:



LEAD CONSULTANT:



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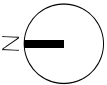


SCALE
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SCALE AS SHOWN (8A)
DRAWING DC-36 (C)
PROJECT 19009
DATE 26-05-2022

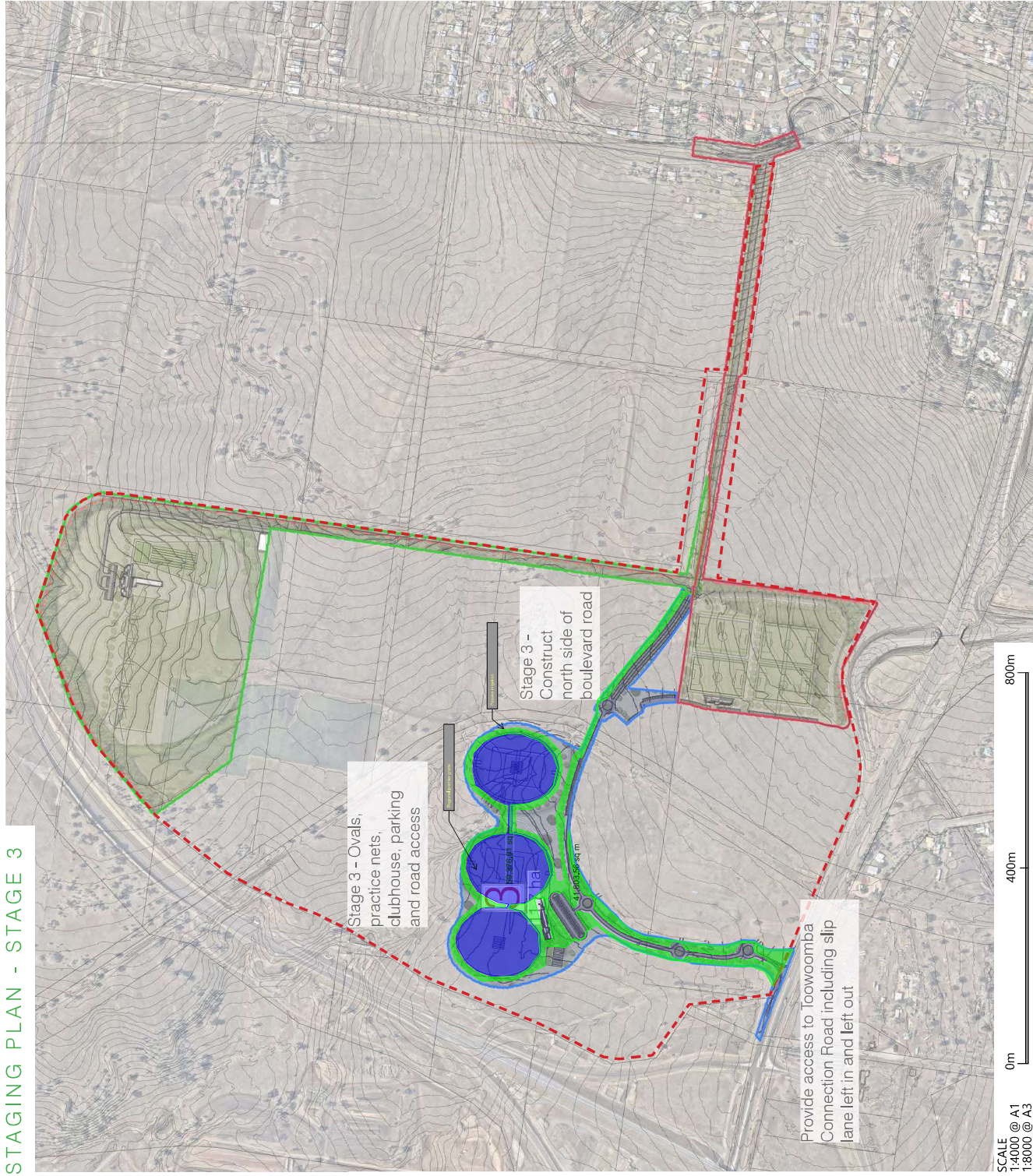
CLIENT:
TOOWOOMBA REGION



LEAD CONSULTANT:
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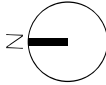
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TOOWOOMBA REGION SPORTS PRECINCT

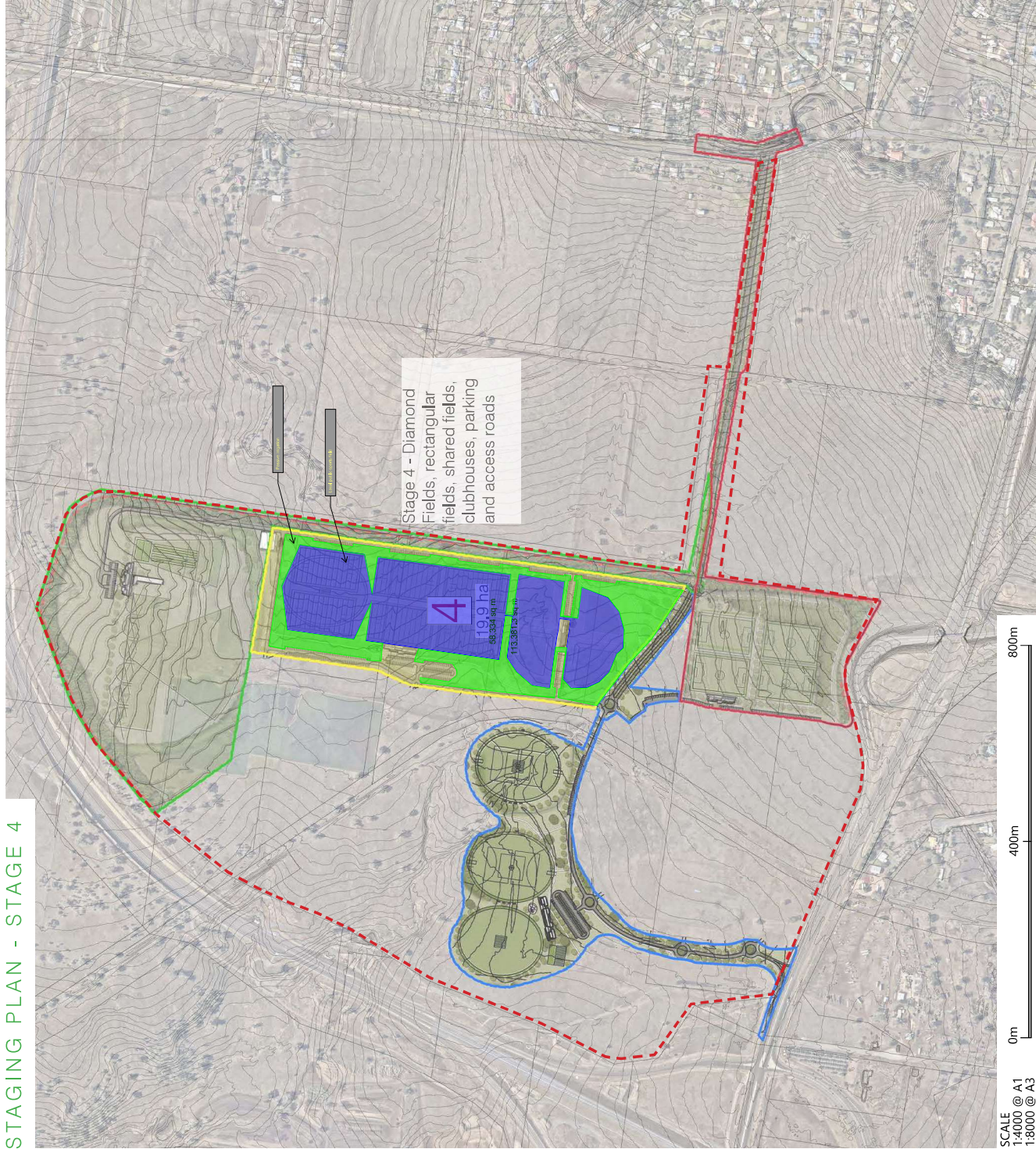
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SCALE AS SHOWN @ A1
DRAWING DC37 [C]
PROJECT 19009
DATE 26-05-2022



CLIENT: **TOOWOOMBA REGION**
CONSULTANTS: **GHD**
LEAD CONSULTANT: **OTIUM SPORT & LEISURE**
open architecture studio

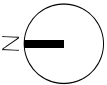


SCALE
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TOOWOOMBA REGION SPORTS PRECINCT

2020 MASTER PLAN

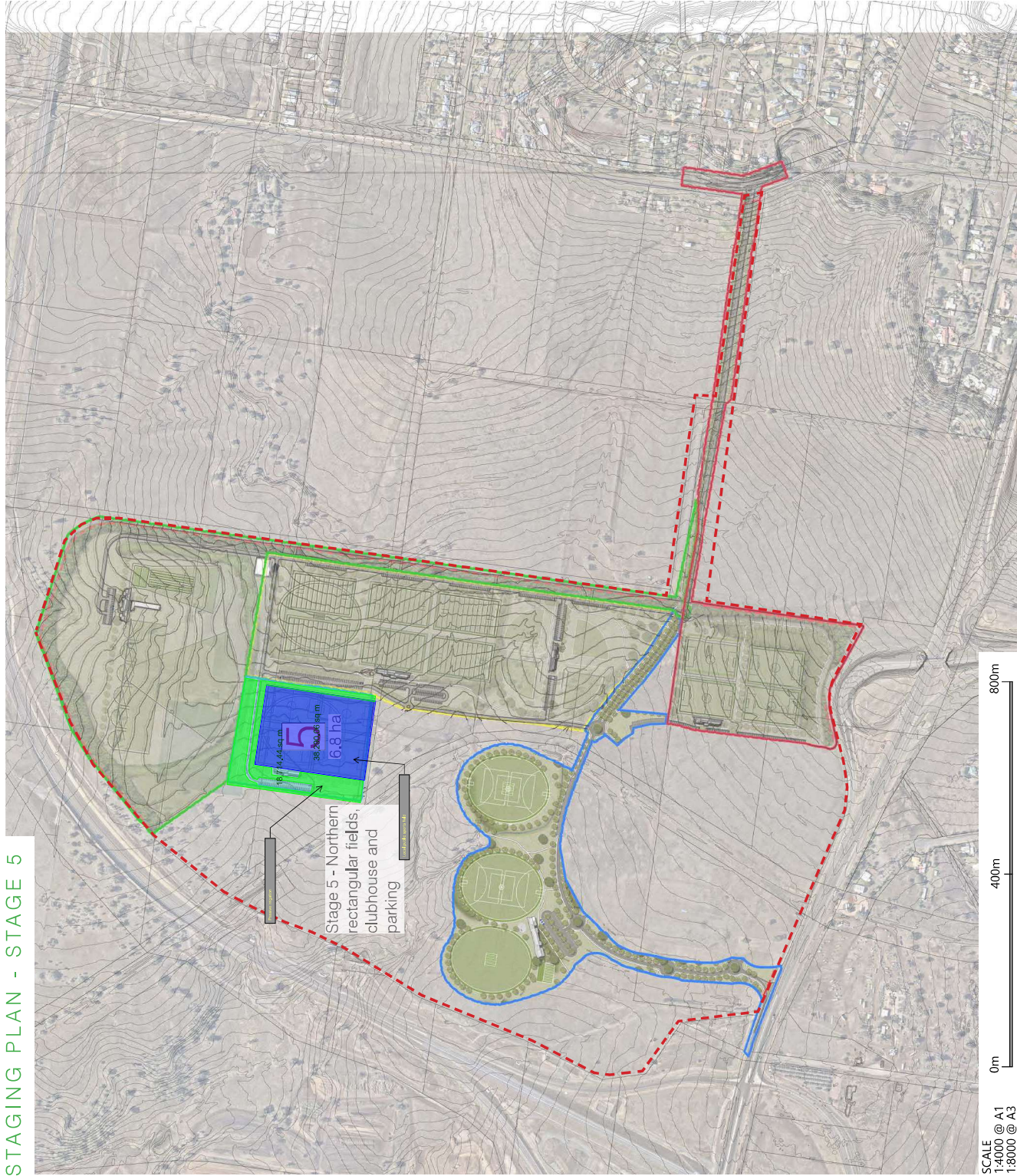
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SCALE AS SHOWN (8A)
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PROJECT 19009
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CLIENT:
TOOWOOMBA REGION
CONSULTANTS:
GHD

LEAD CONSULTANT:
OTIUM SPORT & LEISURE
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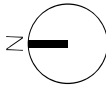
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SCALE AS SHOWN (8:1)
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PROJECT 19009
DATE 26-05-2022



CLIENT:



TOOWOOMBA
REGION

LEAD CONSULTANT:



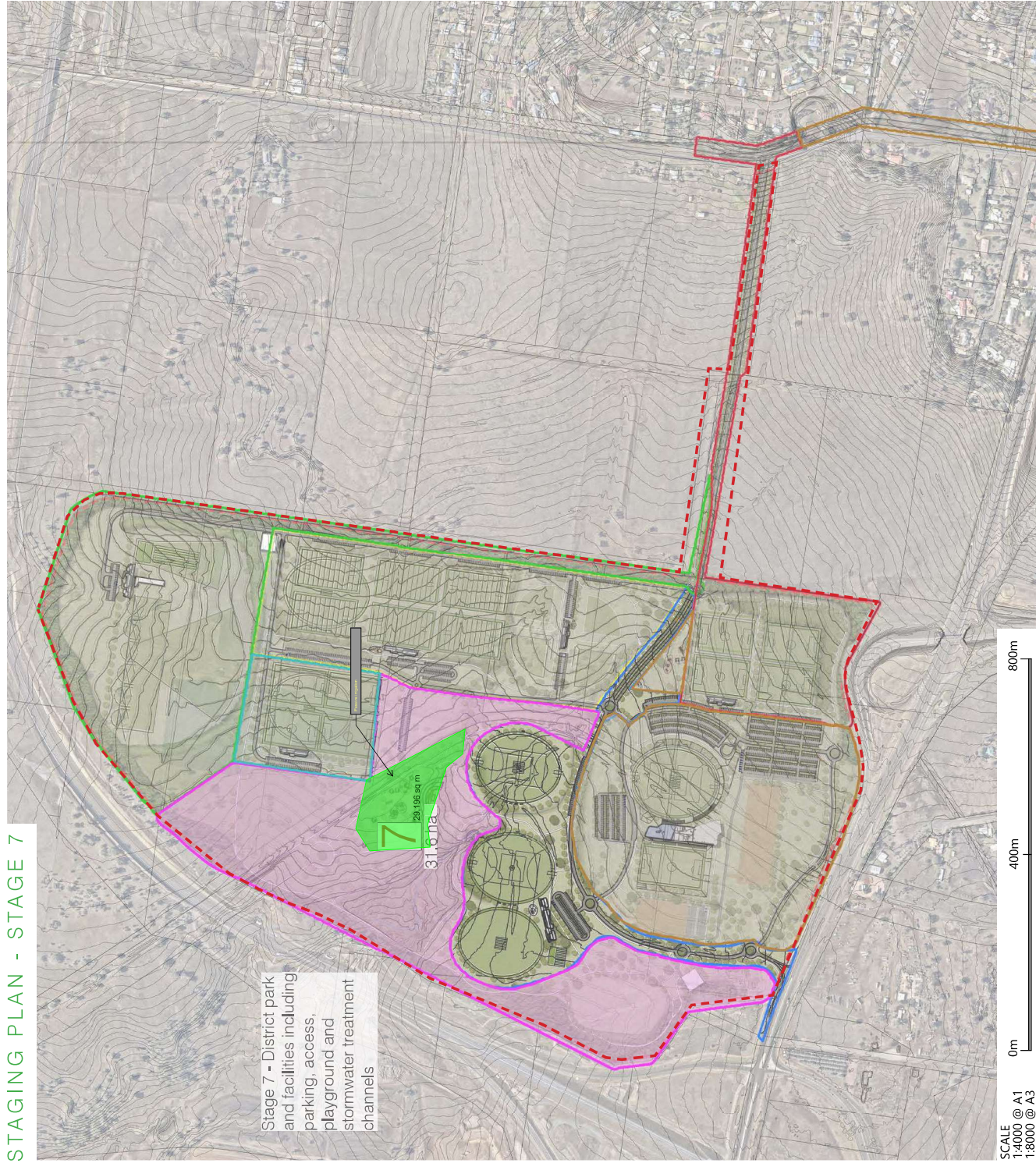
OLTUM
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architecture
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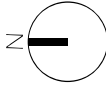
GHD



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SCALE AS SHOWN @ A1
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PROJECT 19009
DATE 26-05-2022

CLIENT:



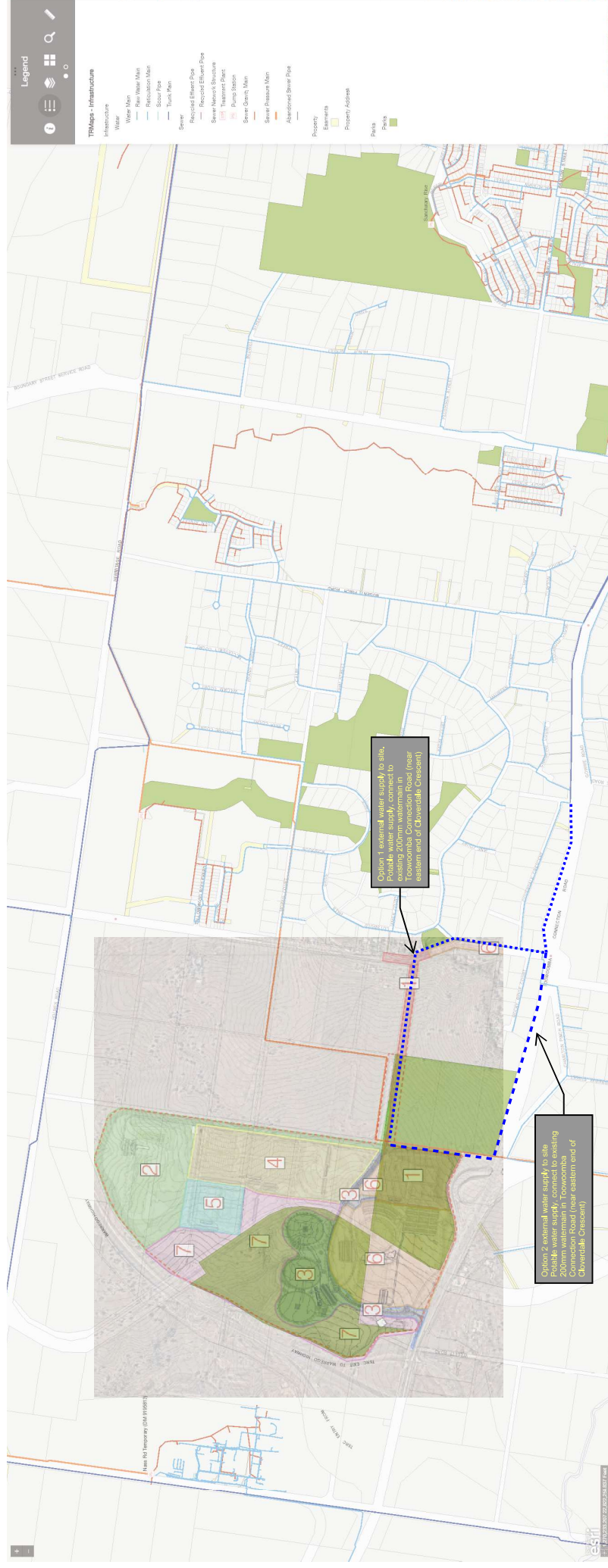
LEAD CONSULTANT:



Appendix E Concept potable water connection locations

Appraisal of concept potable water service options for Toowoomba Regional Sports Precinct

19/11/2021



Option 1 Gowrie Junction Road		Option 2 Toowoomba Connection Road	
Pros	Same distance as option 2. May have benefits if interconnected to other parts of the existing network (e.g. emerging community areas to the north).	Pros	Same distance as option 1.
Cons	Some highly constrained sections along Gowrie Junction Road where the widening to upgrade GR will result in significant cut faces and significant cost to provide additional width for services. Limited width available down new access road (off GR) due to height of road and embankment slopes. Some tree clearing likely.	Cons	Some areas of narrow verge along Toowoomba Connection Road. Watermain required to be built across the top of road cuttings in some locations (check available width). Some tree clearing may be required. Would only service the sports precinct.