ENGINEERING

Integrated Water Management Plan

IWMP for Mount Lofty Golf Estate

JOB NUMBER:	S53897 - 282604
CLIENT:	Venture Capital Developments Pty Ltd
SITE:	Stirling Golf Club, 35 Golflinks Road, STIRLING, SA 5152
DATE:	28/03/2023
REVISION:	1

Engineering your success.

ADELAIDE
MELBOURNE
SYDNEY

Document Status

Rev No.	**Status**	**Author**	**Reviewed by**	**Reviewed Date**
0	For Approval	J Colbert	J Clapp	21.03.2023
1	For Approval	J Colbert	J Clapp	28.03.2023

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Introduction and scope

An Integrated Water Management Plan (IWMP) is a comprehensive approach to managing water resources, namely water supply, rainwater harvesting, stormwater, wastewater, and groundwater resources. The aim of an IWMP is to promote sustainable water use, minimize the impact of development on water resources, and ensure the long-term availability and quality of water resources. This report outlines an IWMP for the proposed development at Mount Lofty Golf Estate, situated within the Adelaide Hills Council. The plan is designed to comply with best practice guidelines and requirements, namely the South Australian Environmental Protection Authority (EPA) and the SA Public Health wastewater requirements.

The Guidelines for the preparation of a Development Report for Mount Lofty Golf Estate, supplied by the State Planning Commission outline the significance of the site, surrounding environment and the risk level surrounding the environmental sustainability, flooding and water quality, surface water and waste management considerations.

Mount Lofty Golf Estate is located within a sensitive watershed catchment, and it is essential to ensure that its water management practices are sustainable and environmentally responsible. This report will provide a roadmap for the implementation of best-practice water management practices that will ensure the long-term viability of the development while protecting the environment and meeting regulatory requirements.

Proposed works

The proposed development plan for this site includes ;

- Hotel - 3-5 level hotel building comprising:
    - 56 hotel suites, 15 x two bedroom serviced apartments, 15 x three bedroom serviced apartments, 2 penthouse serviced apartments.
    - Back of house, plant storage and maintenance areas.
    - A 537m2 function room, A 212m2 restaurant with 89 m2 external terrace, 186m2 sports bar, A 189m2 gallery and cafe.
    - A 94m2 wellness centre with 125m2 gym and spa/massage treatment rooms.
- Private retreats – 'Pods'
    - 17 x one bedroom units.
    - 1 x back of house Service Pod.
- Adaptive reuse of the existing perfumery:
    - Refurbishment of the existing local heritage place to accommodate a multipurpose space for use as café, retail or functions.
    - Extension to the Perfumery to include a covered outdoor dining area.
    - Orchard and perfumery garden plantings to reimagine the former use of the building as a "Scent Factory".
    - Note: the perfumery building will temporarily house the golf club whilst construction is occurring.
- Golf Course Facilities Building - 2-5 level building comprising:
    - Retention of 18-hole golf course with improvements.
    - Refurbished function facilities, cart storage and 138m2 clubhouse in new building.
    - New 97m2 pro-shop, administration areas, gym and change rooms.
- Car Parking, Access and Waste Management
    - A total of 200 car parking spaces in two car parking areas.
    - Emergency vehicle access via western entry from Golflinks Road.
    - Main access point via Golflinks Road.
    - Designated service bay for waste collection and service vehicles.
    - Porte cochere and valet area for guests and buses.
    - A separate entry from Old Carey Gully Road to provide maintenance vehicle access and public access to the perfumery building.

- Designated waste storage areas.
    - Subdivision – following construction of the proposed development, it is proposed to divide the site into three (3) allotments:
    - Allotment 532, with an approximate area of 9,924m2 together with a right of way 'A', comprising the hotel building and pods.
    - Allotment 533, with an approximate area of 5,056m2 together with a right of way 'B', comprising the golf club and facilities building.
    - Allotment 531, with an approximate area of 38.4 hectares, comprising the balance of the golf course, subject to easements 'A' and 'B'.

A site plan and or supporting documentation has been provided within the appendices displaying all water related features and infrastructure for each section of this report as applicable.

Water Balance assessments

DSquared Consulting has undertaken a water balance assessment of the proposed development, summarising the findings below;

The development will achieve at least a 10% reduction in potable water use when compared to a reference building in accordance with the Green Star Buildings v1 rating tool requirements.

Preliminary water balance modelling indicates the development will achieve a 33% reduction in potable water demand when compared with a 'standard practice' reference case as defined by the Green Building Council of Australia. This exceeds Green Star Water Use requirements under the Buildings v1 rating tool.

A 50 kL rainwater storage tank will be provided and harvest rainwater for landscape irrigation, laundry services, and washdown of bin rooms and golf carts, which will contribute 13% of the buildings' total annual water demands, or 25% of the buildings' non-potable water demands.

	Standard practice	**Mount Lofty Golf Estate**
Total water demand (kL p.a.)	6,380	4,884
Rainwater contribution (kL p.a.)	Nil	639 (13% of demand)
Resultant potable water demand (kL p.a.)	6,380	4,245 (33% reduction over standard practice)

Table 1 - Water Balance summary

A copy of the sustainability assessment has been included in Appendix A.

Wastewater Management

FMG Engineering has undertaken an analysis of the wastewater which will be generated from the proposed development (including the Hotel, private retreats, perfumery and Golf Course facilities) in accordance with the SA Health and WSAA code requirements. This analysis has assessed the volume of sludge accumulated on an annual basis, and the maximum daily effluent flow during a full capacity event such as a function. This value is currently estimated as 51,630 L per day, conservatively taken as 60,000L per day for the purpose of sizing balance tanks and pumping arrangements.

The wastewater generated from the development will be stored within a balance tank with sufficient storage to cater for a power failure period of 1 day, totalling 120,000 L. Effluent from this balance tank will be pumped towards an existing Adelaide Hills Council pump station (Stirling Catchment PS2) which is located within the Golflinks Road Reserve, which shares a boundary adjacent the subject site to the south. This pump station elevates wastewater to ultimately discharge into the SA Water Heathfield Wastewater Treatment Plant (WWTP).

FMG has liaised with Adelaide Hills Council who have advised the existing capacity and pump sizes of the PS2 pump station. Using this information FMG has nominated a new pump flow rate specification (2.6 L/s) to replace the existing pumps (1.5L /s) and provide supplementary emergency storage which will ensure the pump station remains compliant with WSA-04 Sewage Pumping Station Code of Australia. The proposed peak flow within the rising main will remain under 1.5m/s and hence an upgrade of the rising main itself is not necessary.

This approach has been reviewed by the Adelaide Hills Council and preliminary endorsement has been provided by written email which has been included as an appendix to this report. SA Water will be consulted as the end receiver of these flows for final approval.

Full design calculations, and correspondence with Adelaide Hills Council has been included in Appendix B.

Stormwater

The majority of existing buildings which affect water on site consists of a number of small golf facility buildings (referred to here within as the clubhouse), associated asphalt hardstand for carparking and deliveries, and the perfumery, which is located discretely away from the clubhouse. These buildings are generally located in the location of future development on the site.

To the north and north-east of the existing clubhouse (which coincides with the future hotel location), Cox's Creek can be observed, along with a man made dam which harvests runoff from the northern side of the Cox's Creek and is used for irrigation of the golf course. No works or modifications are proposed to the existing dam or golf course irrigation methods.

1% AEP flood levels within Cox's Creek have been estimated on a high level basis, with results indicating a maximum flow depth of 2.5m from the invert of Cox's Creek. The lowest Finished Floor Level (FFL) within the development is located approximately 5.5m above the invert of the adjacent watercourse, ensuring a minimum freeboard in the order of 3m. This freeboard is sufficiently large enough to mitigate the need for further studies of the watercourse or flooding. No anecdotal reports of flooding of the current clubhouse buildings were reported by the asset owners.

Cox's Creek runs through the site, flowing in a south easterly direction. Generally, this is located at the low point of the entire golf course site, with smaller tributaries flowing into Cox's Creek. All runoff from the existing buildings flow into Cox's Creek, through a series of formal and informal flow paths. Drainage for the minor system consists of roof drainage, stormwater inlet pits and pipes which can be observed on site and in

aerial imagery, but condition, capacity and alignment are not well documented, and assumed to be beyond useful life. To the south of the existing buildings, an upstream catchment of approximately 6ha is observed, and is generally funnelled around the east and west of the clubhouse buildings informally under current conditions.

Under the proposed development, runoff from upstream catchments will be safely routed around the east and west of the proposed building, mimicking existing conditions and protecting the development from inundation. Runoff intercepted by the roof area will be harvested for reuse as outlined within the Water Balance section of this report. Runoff captured at surface level within the hotel will be collected into a minor stormwater pit and pipe network fitted with gross pollutant intercepting baskets, or conveyed via overland flow during a major storm event, towards a stormwater basin located adjacent Cox's Creek. Within this basin a tertiary level water quality improvement will be achieved through use of a bioretention raingarden capable of treating at least the volume of runoff generated by the 4EY ARI in accordance with the EPA and Water Sensitive SA best practice guidelines.

Stormwater collected into the basin will also be detained to ensure post-development peak runoff does not exceed the pre-development peak runoff figures for the minor and major storm respectively. The detention volume held within this basin during the 1% AEP storm event is estimated to be in the order of 150m^3. Should further investigations determine this basin is required to be enlarged, sufficient room exists along the length of Cox's creek to increase the basin size. The basin is likely to be nominated beyond the 1% AEP flood level, however could be designed to be adequately protected within the floodway if required.

All wastewater infrastructure, general waste infrastructure and equipment storage facilities will be nominated within the footprint of the proposed hotel facility, which will be at or above the minimum FFL of 419.80mAHD, and adequately protected from upstream catchments which will be safely diverted around or away from the building along existing overland flow routes.

The detailed stormwater management plan can be found within Appendix C where further calculations are provided.

A review of SARIG mapping suggests a depth to groundwater in the order of 5-10m throughout the subject site. No works are proposed which will affect groundwater, however groundwater may be encountered during construction depending on proposed footing systems.

Conclusion

It is the conclusion of this report that the proposed works can be suitably designed and developed to holistically manage water both on site and within the surrounding catchment to mitigate negative effects on the environment. This assessment has been undertaken with consideration to the EPA, SA Health and WSAA code requirements, along with best practices for stormwater management.

This report will be updated upon receipt of final approvals for proposed wastewater management solutions when received from authorities.

Appendix A

Dsquared Sustainability Report

dsquared

Mount Lofty Golf Estate

Sustainability Strategy Report

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Project Number: 2623

Issue	Date	Change	Checked	Approved
01	07/09/2022	Development Report Issue	JB	DD

Our vision is to think beyond the square.

Our mission is to reduce the impact on the environment of our client's actions by providing innovative solutions, challenging perceived thinking, and pushing the boundaries of achievement whilst using all resources in a sustainable way.

We confirm that all work has been undertaken in accordance with our ISO 9001 accredited quality management system.

Acknowledgement of country

The dsquared team wish to acknowledge the Traditional Custodians of all country throughout Australia, and their cultural, spiritual, physical, and emotional connection with their land, waters, and community. We pay our respects to all Elders past, present, and emerging.

Contents

1 Introduction

1.1 Introduction

This report presents the Sustainability Strategies and Ecologically Sustainable Design (ESD) initiatives proposed for the Mount Lofty Golf Estate development, which will reduce the development's impact on the environment in both construction and operation.

The proposed development has been designed with a holistic approach to ESD, creating an exemplar environment for all users including visitors, guests, and staff, while minimising energy use and greenhouse gas emissions.

This report follows the development of the master plan and building designs by the design team led by R-Architecture. Computer building simulation design techniques have been employed to inform the design initiatives and to assess the sustainability performance of the built form.

1.2 Strategy

The sustainability strategy and outcomes proposed are summarised as follows:

2 Performance

2.1 Green Star certification

The project will obtain a certified Green Star As-Built rating using the Green Building Council of Australia's new rating tool 'Buildings v1', which is the GBCA's next-generation rating tool replacing the previous 'Design and As-Built' tool.

The project is targeting a 5 Star outcome under the GBCA's new Buildings v1 rating tool. The GBCA defines 5 Stars as 'Australian Excellence' in sustainable building design.

The project will also obtain a Green Star Design Certification prior to the construction stage commencing.

Obtaining a third-party certified Green Star rating acts as a verification method for the project's ESD design initiatives and modelled performance outcomes. This approach will ensure ESD remains a core part of the project scope throughout the detailed design and construction phases.

2.2 Energy

The development is being designed and will be constructed to meet the energy efficiency requirements of the Green Building Council of Australia's Green Star Buildings v1 rating tool, which are as follows:

- The development will achieve at least 10% better energy and greenhouse gas emissions performance compared with a NCC / BCA 2019 deemed-to-satisfy reference case; and
- The façade and building fabric will exceed the NCC / BCA 2019 deemed-to-satisfy requirements for energy efficiency and thermal performance.

Preliminary modelling of the proposed concept design indicates that the development's **energy consumption will be 24% lower** than a NCC 2019 deemed-to-satisfy reference case, and its **carbon emissions from energy use will be 18% lower**. Refer to section 3 for a list of energy efficiency initiatives which will contribute to achieving these outcomes.

	Reference Building (NCC 2019 code compliant)			Mount Lofty Golf Estate		
	Electricity kWh p.a.	Gas MJ p.a.	CO_2 emissions kg CO_2e p.a.	Electricity kWh p.a.	Gas MJ p.a.	CO_2 emissions kg CO_2e p.a.
Hotel	375,681	443,790	185,390	387,452	0	162,730
Facilities Building	404,465	159,948	179,824	323,067	0	135,688
Accommodation Pods	132,145	91,440	61,188	124,262	0	52,190
Total	**912,291**	**695,178**	**426,402**	**834,781**	**0**	**350,608**

Energy modelled performance results

	Reference Building (NCC 2019 code compliant)	Mount Lofty Golf Estate	Improvement
Energy use (MJ p.a.)	3,979,426	3,005,212	24%
CO_2 emissions (kg CO_2e p.a.)	426,402	350,608	18%

Energy modelled performance summary

2.3 Carbon emissions

The development will be all-electric and will not use fossil fuels (natural gas) for heating, cooling, or hot water services, promoting the transition to 100% renewable energy from off-site and on-site sources.

20% of the development's annual electrical demand will be supplied by on-site renewable energy via a rooftop solar PV system.

A Zero Carbon Action Plan will be prepared and will include strategies for how the project will achieve net zero carbon emissions in operation. This includes strategies for phasing-out and eliminating all fossil fuels from the development and transitioning away from petrol- and diesel-powered golf carts and grounds maintenance vehicles and equipment.

2.4 Daylight

All hotel suites and public facilities (golf club, restaurant, and function rooms) have access to daylight in accordance with Green Star standards.

The daylight access has been verified using IES Virtual Environment building computer simulation software, with modelled results as follows. Sample plots from the daylight modelling are provided in Appendix A.

	Occupied floor area (sqm)	Compliant area (sqm) *(Note 1)*	Compliant % *(Note 2)*	Green Star result
Facilities Building	1,802	993	55%	Complies
Hotel Building	3,084	1,488	48%	Complies
Accommodation Pods	651	433	66%	Complies
Whole development	**5,538**	**2,913**	**53%**	**1 out of 2 points achieved**

Daylight modelling results

Note 1: Compliance target is a minimum of 160 lux of daylight achieved during >80% of daytime hours.
Note 2: Green Star targets are 40% compliant area for 1 point, or 60% for 2 points.

Refer also to Appendix A for sample daylight modelling plots.

2.5 Water

The development will achieve at least a 10% reduction in potable water use when compared to a reference building in accordance with the Green Star Buildings v1 rating tool requirements.

Preliminary water balance modelling indicates the development will achieve a 33% reduction in potable water demand when compared with a 'standard practice' reference case as defined by the Green Building Council of Australia. This exceeds Green Star Water Use requirements under the Buildings v1 rating tool.

A 50 kL rainwater storage tank will be provided and harvest rainwater for landscape irrigation, laundry services, and washdown of bin rooms and golf carts, which will contribute 13% of the buildings' total annual water demands, or 25% of the buildings' non-potable water demands.

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Resultant potable water demand (kL p.a.)	6,380	4,245
Improvement achieved	-	33%

Water modelling results

3 Initiatives

3.1 Passive Design

The following passive design features are included:

1. Buildings are oriented north which captures free heating from the winter sun. External shade elements and balconies provide shade protection from the summer sun.
2. The building form, façade shading elements, and glazing system specifications have been informed by energy performance modelling and computer simulation techniques.
3. High performance double-glazed facades are provided throughout the development. Glass systems' solar heat gain coefficients (SHGCs) have been optimised for each building type depending on solar exposure, to provide an optimum balance between summer and winter comfort.

   Façade glazing systems will meet the following performance specifications.

	U-value Whole of system $W/m^2.K$	Solar Heat Gain Coefficient (SHGC)	Visible Light Transmittance (VLT)	Glazing system type
Hotel Building	3.2 or less	0.40 or less	45% or higher	Double-glazed Neutral glass with low-E performance coating
Facilities Building	3.2 or less	0.40 or less	45% or higher	Double-glazed Neutral glass with low-E performance coating
Eco Pods	3.5 or less	0.50 or less	50% or higher	Double-glazed Neutral or clear glass

Façade glazing performance specifications

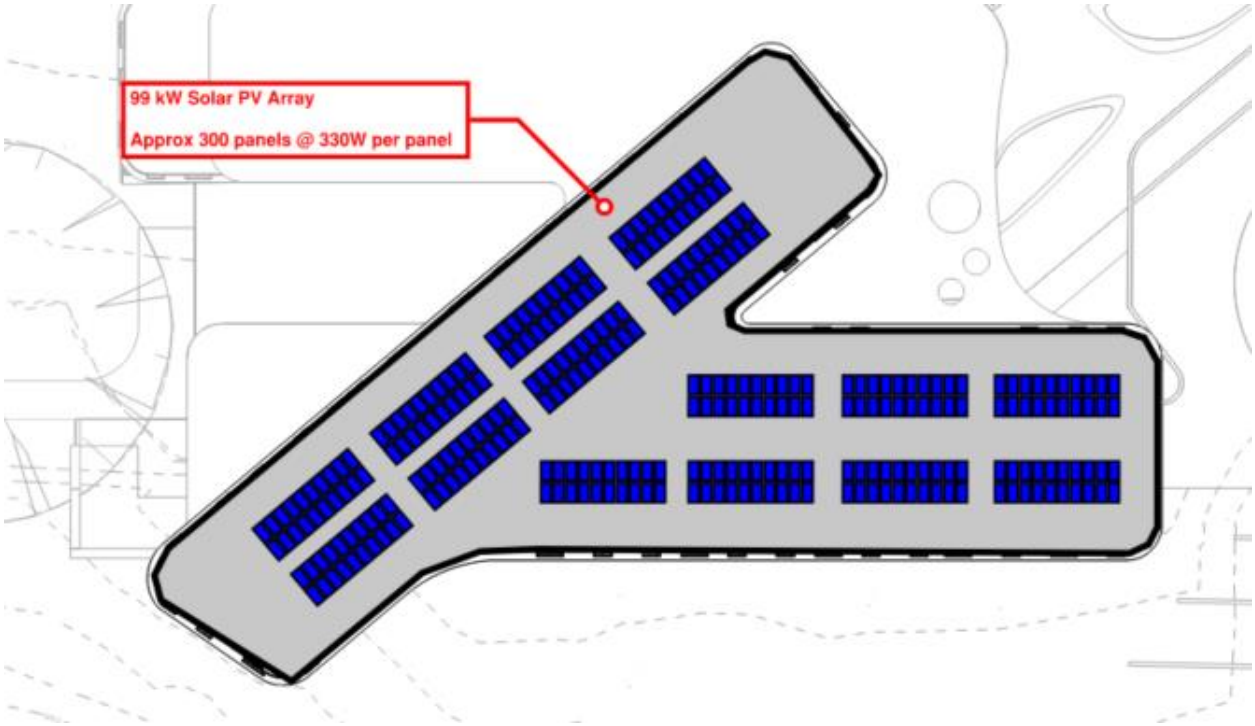
4. Natural ventilation is available in all hotel rooms and the gallery/café space, thereby reducing mechanical cooling demands.
5. The external façade will be subject to air leakage pressure testing to ATTMA standards, and the façade supplier required to meet prescribed air leakage rates as per GBCA / Green Star Standards. As well as significantly reducing the air conditioning energy consumption, this will also improve the indoor air quality, particularly during high external air pressure conditions.
6. Passive cooling from green roof, façade planters, and green landscaping around the buildings. Water transpiration from the plants and landscaping provides a natural cooling effect.
7. Light-coloured roof finishes and landscaping finishes will minimise heat absorption and reduce the heat island effect in accordance with Green Star standards. Roof finishes will have a solar reflective index (SRI) of minimum 82 and hardscaping elements at ground level will have a solar reflective index (SRI) of minimum 39.
8. Daylight is provided to all hotel rooms and indoor public spaces (Restaurant, Function Room, Golf Club and Sports Bar) which reduces artificial lighting demand.

3.2 Energy

The following Energy initiatives are included:

1. The building is fully electrified including cooling, heating, hot water, and cooking (no fossil fuels / natural gas).
2. A rooftop solar PV array provides renewable energy to power the building. Energy balance modelling demonstrates the system will provide at least 20% of the site's annual energy demand.

   A solar PV layout sketch is shown as follows (refer also to Appendix B).



Proposed solar PV array

3. HVAC systems comprise high-efficiency air-cooled heat pump thermal plant for heat rejection and heat injection. All central plant is contained within distinct plant enclosures which minimises acoustic impacts and visual obtrusiveness of plant equipment.
   - A ground-loop heat exchange system is being explored as an alternative heat rejection strategy, in collaboration with specialist consultants GeoExchange. This option will further improve heating and cooling system efficiencies and will provide a natural and renewable source of thermal energy from the ground.
4. A shared condenser water loop system will provide heating and cooling energy to the Hotel and Facilities buildings using an efficient centralised approach.
5. Heat recovery between HVAC and domestic hot water systems via the shared condenser water loop system. In summer when HVAC systems are in cooling mode and rejecting heat from the occupied spaces into the condenser water loop, the rejected heat energy will be recovered and used to heat water for showering and other domestic hot water uses.
6. High-efficiency electric heat pump domestic hot water plant. System efficiency rating (Coefficient of Performance) will be in excess of 300% efficient.

7. All hotel rooms have access to natural ventilation via private balconies. Air-conditioning will shut down automatically whenever the balcony door is left open, to save energy when guests choose to open up their room and allow natural ventilation and external breezes to enter.
8. Air-conditioning and lighting in hotel rooms will switch off automatically when rooms are unoccupied.
9. Economy cycle HVAC mode provides free-cooling in public spaces (Restaurant, Function Room, Golf Club and Sports Bar).
10. Demand-controlled ventilation including indoor CO_2 monitoring will reduce thermal loads in public spaces (Restaurant, Function Room, Golf Club and Sports Bar) whilst maintaining a high indoor air quality at all times.
11. Automatic BMS controls for retail and commercial HVAC systems with distinct thermal zoning to suit the comfort needs of individual areas.
12. Energy efficient LED lighting throughout.
13. Energy metering and sub-metering of distinct load centres, connected to a fully integrated BMS.

3.3 Water

The following Water initiatives are included:

1. A rainwater capture and reuse system will provide rainwater for landscape irrigation, laundry services, and washdown of golf carts/waste storage rooms. A 50 kL rainwater storage tank will contribute 13% of the development's total water demand / 25% of non-potable water demand.
2. Landscaping comprises native and drought-tolerant planting species which have low irrigation water demands.
3. Water efficient fittings with the following minimum WELS ratings:
    - Taps 6 Stars
    - WCs 4 Stars
    - Urinals 4 Stars
    - Showers 4 Stars
4. Selecting water-efficient washing machines and dishwashers which are within one Star of the highest available water rating.
5. No water will be consumed for HVAC heat rejection purposes, i.e. no cooling towers. All HVAC heat rejection will be air-cooled or via ground heat exchange.
6. Stormwater systems designed such that pre-development peak stormwater outflows will not be exceeded, and all stormwater run-off will be appropriately treated before discharge to the local waterways. The use of stormwater detention tanks will contribute to meeting these outcomes.

3.4 Waste

The following Waste initiatives are included:

1. Construction waste will be minimised through efficient design techniques including standardisation and off-site pre-fabrication wherever practicable. A minimum 90% diversion from landfill rate will be targeted.
2. Separate bins will be provided for organic waste, recyclable waste, and general waste, to encourage and facilitate diversion of waste from landfill.

3. Waste storage facilities for the collection and disposal of general, recyclable, organic waste, and bulky waste, which will be separated on site to facilitate ease of disposal for recycling.
4. A site-specific Operational Waste Management Plan will be developed in accordance with Green Building Council of Australia guidelines for best practice waste management. The Plan will inform the design of waste storage and handling facilities, waste bin provisions, and signage requirements.

3.5 Indoor Environment Quality

The following Indoor Environment Quality initiatives are included:

1. All hotel suites and accommodation pods have access to natural ventilation via private balconies.
2. Mechanical ventilation will be provided to hotel rooms when balcony doors are closed, and to all public spaces. Outside air supplies will be in accordance with Green Star and AS1668.2 minimum requirements.
3. Daylight access is provided in all hotel suites, accommodation pods, and public spaces (Restaurant, Function Room, Golf Club and Sports Bar) in accordance with Green Star criteria (minimum 160 lux of daylight during at least 80% of daytime hours).
4. Glare from sunlight is managed through a combination of external shade elements, internal blinds, and building orientation (north-facing aspect).
5. Views to the surrounding natural landscapes are available in all occupied spaces.
6. The use of low VOC and low formaldehyde paints, sealants, adhesives, carpets, coverings, and furniture.
7. Acoustic performance in occupied spaces will be in accordance with Green Star and AS 2107 standards. Façade systems, acoustic treatments to internal ceilings and walls, and services plant will be designed to meet Green Star acoustic standards. This includes background noise levels, reverberation levels, and acoustic privacy requirements.
8. Air conditioning systems will be centralised, concealed, and located in acoustically sheltered plant areas, such that external noise will not impact on the amenity of guests, customers, or staff.

3.6 Construction

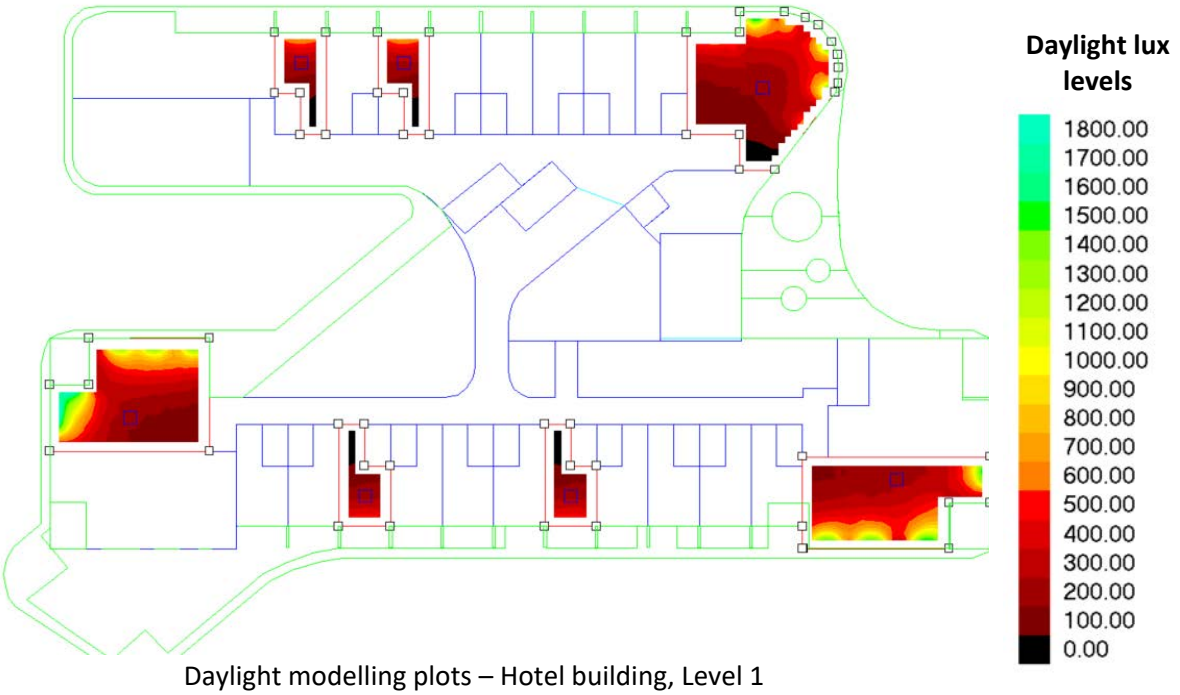
The following Construction initiatives are included:

1. Embodied carbon of construction (i.e. ‘upfront emissions’) will be at least 10% lower than a reference case, in line with Green Star requirements.
2. Refrigerants with low Global Warming Potential (GWP) ratings will be specified for central thermal plant and hot water plant.
3. Building materials which are made from recycled materials e.g. fly ash in concrete, reinforcement bar, recycled content floor coverings, and recycled insulation products, wherever viable.
4. Head contractor will be required to implement an Environmental Management Plan compliant with Green Star standards.
5. Using off site pre-fabrication techniques to reduce on site construction time, waste, and greenhouse gas emissions, wherever practicable.
6. Locally sourced materials and labour will be sought wherever viable.
7. Using Building Information Modelling (BIM) as a design and construction management tool to minimise on-site clashes and abortive/wasteful work.

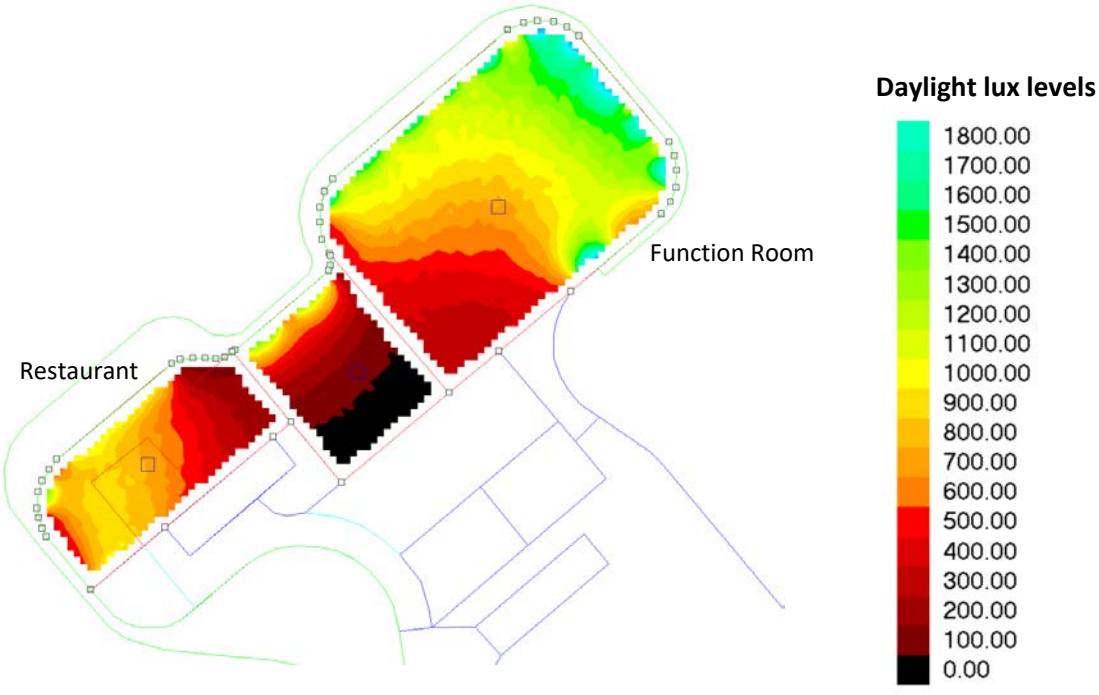
3.7 Community and Social Sustainability

The following social sustainability initiatives are included:

1. The development includes a Wellness Centre, Gym, and extensive common outdoor amenity space.
2. The Facilities building is designed and located as a shared gathering point for various users and visitors including golf players, hotel patrons, restaurant customers, gym users, and Function Room guests. Shared outdoor terraces encourage interaction and community between the various user groups.
3. A communal creche / childcare is provided in the Hotel building.
4. All public spaces have good access to daylight, ventilation, and views to the surrounding landscapes.
5. Heritage listed Scent Factory building from the historic Mount Lofty Flower Farm will be restored as part of the development works, and incorporated as an attraction feature for guests and visitors to the development.
6. Local ecology and vegetation will be featured and integrated into the development.

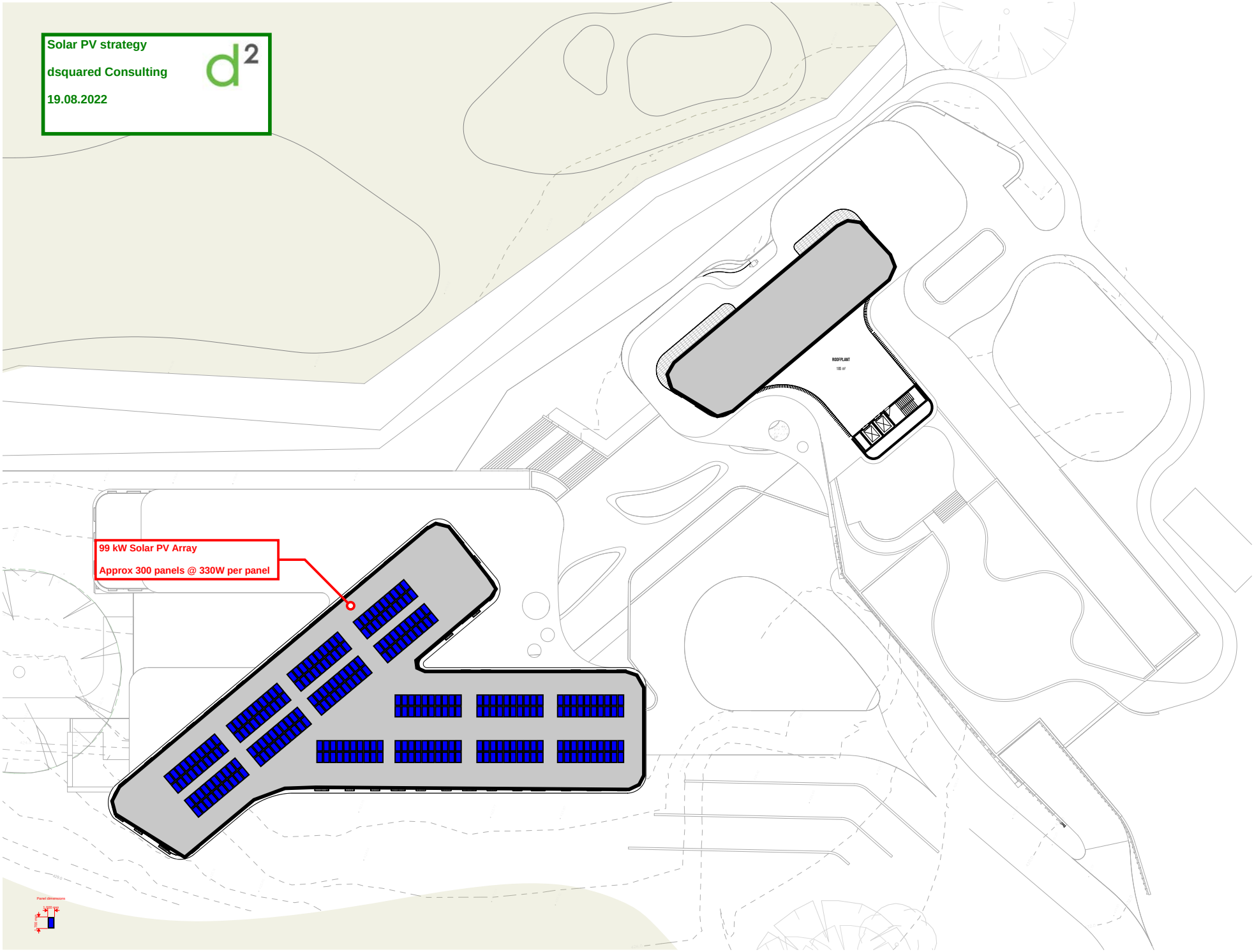


Daylight modelling plots – Hotel building, Level 1



Daylight modelling plots – Facilities building, Level 1

Appendix B Solar PV sketch layout



HOTEL DEVELOPMENT SUMMARY

35 GOLFLINKS RD, STIRLING, SA.

DEVELOPMENT SITE AREA	
HOTEL	
SUITES	56 SUITES
SERVICED APARTMENT - 2 BED	15 APARTMENTS
SERVICED APARTMENT - 3 BED	15 APARTMENTS
PENTHOUSE APARTMENTS	2 APARTMENTS
TOTAL	88 UNITS
PODS	
TOTAL	20 UNITS - 1 BEDROOM
PARKING	
CAR SPACES - MAIN BUILDING	200 SPACES
CAR SPACES - PERFUMERY OVERFLOW	50 SPACES

AREA SUMMARY

AREA TYPE	AREA
FACILITIES	
BACK OF HOUSE / SERV - LG	1039 m²
BACK OF HOUSE / SERV - LVL 1	233 m²
GROUND FLOOR - F&B	325 m²
GROUND FLOOR - GOLF	429 m²
LEVEL 1	1393 m²
LEVEL 2	570 m²
LEVEL 3	447 m²
LOWER GROUND	937 m²
SERVICES CORE-L3	54 m²
	5426 m²
FACILITIES CARPARK	
FIRST FLOOR CARPARK	1461 m²
GROUD FLOOR CARPARK	1886 m²
LOADING BAY	67 m²
	3413 m²
HOTEL	
GROUND FLOOR	1095 m²
LEVEL 1	2334 m²
LEVEL 2	1659 m²
LEVEL 3	1921 m²
LOWER GROUND	1149 m²
	8157 m²
HOTEL CARPARK	
HOTEL CARPARK	1352 m²
LOWER GROUND CARPARK	1515 m²
	2867 m²
Grand total: 19	19864 m²

No.	Description	Date
A	CONSULTANT REVIEW	20.10.21
B	DA SUBMISSION	01.12.21

PROJECT
MOUNT LOFT GOLF ESTATE

ADDRESS
35 GOLF LINKS ROAD, STIRLING SA 5152

Scale@A1	1:250
Scale@A3	1:500
Date:	01.12.21
Drawn:	Author

SHEET NAME
LEVEL 3 PLAN

SHEET NO.
TP06

REVISION:
B

PRELIMINARY *NOT FOR CONSTRUCTION*

r architecture
architecture | interior design | urban design | landscape
ph: 8362 0328 e: studio@rarchitecture.com.au

Appendix B

Preliminary Wastewater Management Plan
Council Endorsement of preliminary plan

ENGINEERING

Engineering your success.

ADELAIDE
MELBOURNE
SYDNEY

Ref: 282604 / S53897
28/03/2023

Re: Wastewater proposal at Mount Lofty Golf Estate

FMG Engineering has been engaged to prepare a plan for managing wastewater generated by the proposed development at Mount Lofty Golf Estate.

The subject site is located within the Adelaide Hills Council (Council), which operates and maintains a number of community waste management schemes (CWMS) to service areas which cannot drain sewer via gravity to SA Water infrastructure, as is the case with the subject development site. Adjacent to the site, no SA Water infrastructure is present, however a Council owned and operated pump station is present on the corner of Old Carey Gully Road, and Spring Gully Road.

FMG Engineering has presented a preliminary wastewater management plan to Council that has been endorsed and supported which can be summarised as;

- Collection of wastewater from all wastewater generating facilities into septic tanks which are desludged on a yearly basis
- Residual effluent from the septic collection will be conveyed into a holding tank, and pumped to the existing Council pump station on Golflinks Road at nominally 1.4 L/s.
- Council's existing pump station will be upgraded from the current 1.5L/s capacity, to a new pump capacity of 2.6L/s within the existing rising main. Additionally, a further 20m^3 of emergency storage will be provided below ground at the Council pump station.

On the above in principal support, FMG has prepared preliminary wastewater calculations in accordance with SA Health and WSAA code requirements which provides indicative minimum sizing of septic tanks. Final details will be confirmed to the satisfaction of Adelaide Hills Council and SA Water during detailed design. A schematic has also been attached for reference.

This letter outlines a feasible plan for managing wastewater which can be assessed for planning purposes, with final details to be confirmed and approved by SA Health and referred to Adelaide Hills Council as the approving authorities.

Yours sincerely

Jordan Colbert

National Civil Manager
FMG Engineering

Attached: Wastewater calculations
Schematic plan

Desludge Rate 1 years

Accommodation

Sludge/Scum Rate (S)	48	L/person/year
Daily Flow (DF):	100	L/person/day

Non-resident staff

Sludge/Scum Rate (S)	25	L/person/year
Daily Flow (DF):	30	L/person/day

Function centre (Seminar/Conference)

Sludge/Scum Rate (S)	35	L/person/year
Daily Flow (DF):	40	L/person/day

Restaurant

Sludge/Scum Rate (S)	35	L/person/year
Daily Flow (DF):	20	L/person/day

Sports Bar

Sludge/Scum Rate (S)	5	L/person/year
Daily Flow (DF):	10	L/person/day

Gallery Café

Sludge/Scum Rate (S)	30	L/person/year
Daily Flow (DF):	10	L/person/day

Perfumery Restaurant

Sludge/Scum Rate (S)	35	L/person/year
Daily Flow (DF):	20	L/person/day

Golf course facilites included in numbers above

Number of single bed equivalents (P1)	Number of single bed equivalents (P2)	
305	305	45140 L

Number of staff per shift x number of shifts (I	Number of staff per shift x number of shifts (P2)	
101	101	5555 L

Total seating capacity (P1)	Total seating capacity (P2)	
270	270	20250 L

Average daily number over 7 days (P1)	Highest daily number over 7 days (P2)	
50	100	3750 L

Average daily number over 7 days (P1)	Highest daily number over 7 days (P2)	
80	160	2000 L

Average daily number over 7 days (P1)	Highest daily number over 7 days (P2)	
85	170	4250 L

Average daily number over 7 days (P1)	Highest daily number over 7 days (P2)	
50	100	3750 L

Sludge	39515	L/year		
Total Daily Flow	51630	L	**Tank Size**	**84695** L
			(SxP1xY) + (PSxDF)	

All commercial kitchens are to have grease arrestors fitted and sized using SA Water guidelines

Desluge rate to be every **1 years**

FMG ENGINEERING	Project: Stirling Golf Club, 35 Golflinks Road, STIRLING, SA 5152				Job Ref.: 282604 - S53897	
	Section: Balance Tank Calculations				Sheet no./rev.: 1 / D	
	Calc. by: Jarrad Barford	Date: 23/03/2023	Chk'd by: Jordan Colbert	Date: 23/03/2023	App'd by:	Date:

Internal wastewater pump and holding tank design

As per Wastewater Calculations total maximum daily effluent flow is 51,630L.

To allow for an additional buffer round this volume up to 60,000L.

Due to the size of the development it is assumed that backup generators will be installed on site. Allow for a worst-case power failure period of 1 day.

Balance tank to be 120,000L in size.

This volume is to be completely emptied before the next peak cycle occurs. This is assumed to be the following day, i.e. subsequent events. On this basis the total tank volume must be empited within 24 hrs.

120000 L/ (24x60x60) = 1.389L/s ≈ 1.4L/s

Two pumps of pump rate 1.4L/s shall be provided, the two pumps shall be configured to automatically alternate as the duty pump.

Downstream receiving pump station capacity

Adelaide Hills Council has provided a series of calculations outlining the current capacity of the Stirling STEDS network;

- We understand there are two pump stations as part of the Stirling STEDS network;
  - PS1 on Golf Links Road (at the eastern end of Golflinks Road) which pumps effluent towards PS2
  - PS2 at the intersection of Golf Links Road, and Golf Links Close, which receives flow from PS1, and is then assumed to pump onwards to SA Water infrastructure outside of AHC's control.
- To mitigate upgrading two pump stations, we have revised our proposal to show the rising main to be connected to PS2
- Due to the increased inflow rate (an additional 1.4 L/s as per the attached balance tank sizing calculations sheet, the pumps within PS2 will need to be upgraded. Our review of the calculations package suggests a new pump capacity of 2.6L/s may be appropriate, as this keeps velocities within the 50mm rising main to <1.5m/s and approximately 80m of head loss.
- The increased inflow results in a deficiency in emergency storage at PS2. As a result, an additional 20m^3 of supplementary emergency storage is proposed to augment to the existing pump station. This will take the form of a concrete chamber below ground adjacent the pump station which will be linked. All storage will be provided between the invert and high level alarm elevation. Provision of this additional storage ensures an emergency storage % of ADF of 50.7% is achieved, aligning with the WSAA requirements for >50% emergency storage.

Stirling STEDS - Pump Stations Summary

							Entire Network power failure			Local station failure			
Pump Station	Location	Pump discharge (L/s)	Peak Inflow (L/s)	Pump Rate > Peak Inflow	Pump rate achieves % of peak inflow	Storage above HLA (m^3)	Storage at ADF (hours)	> 5 hours (20%) storage @ ADF?	emergency storage % of ADF	Storage at ADF (hours)	> 5 hours (20%) storage @ ADF?	emergency storage % of ADF	Comment
PS1	End of Golf Links Road	1.000	0.221	Yes	452%	6.795	25.60	Yes	106.7%	25.60	Yes	106.7%	
PS2	Golf Links Road near Golf Links Close	1.500	0.953	Yes	157%	14.379	16.38	Yes	68.2%	12.58	Yes	52.4%	

Council capacity summary under Existing Conditions at the Stirling STEDS pump network

Stirling STEDS - Pump Stations Summary

							Entire Network power failure			Local station failure			
Pump Station	Location	Pump discharge (L/s)	Peak Inflow (L/s)	Pump Rate > Peak Inflow	Pump rate achieves % of peak inflow	Storage above HLA (m^3)	Storage at ADF (hours)	> 5 hours (20%) storage @ ADF?	emergency storage % of ADF	Storage at ADF (hours)	> 5 hours (20%) storage @ ADF?	emergency storage % of ADF	Comment
PS1	End of Golf Links Road	1.000	0.221	Yes	452%	6.795	25.60	Yes	106.7%	25.60	Yes	106.7%	
PS2	Golf Links Road near Golf Links Close	2.600	2.353	Yes	111%	34.379	39.16	Yes	163.2%	12.18	Yes	50.7%	Additional 1.4L/s inflow, accordingly pump discharge has been increased to 2.6 L/s. Additional 20m3 of storage volume also to be provided at PS2 to achieve a minimum 50% emergency storage volume

Council capacity summary following connection of proposed 1.4 L/s additional inflow.

01 HOTEL & GOLF CLUB
02 PODS
03 MAIN ENTRY
04 PERFUMERY
05 PERFUMERY CAR PARK
06 MAINTENANCE AREA & PARKING
07 PROPOSED ENTRY
08 LAKE RESTORATION
09 OLD WOODHOUSE MANOR
10 WOODHOUSE - HOOPER BUNKHOUSE
11 WOODHOUSE - ACTIVITY CENTRE & CARPARK
12 WOODHOUSE - BASECAMP & PARKING
13 RESIDENTIAL AREAS
14 MT GEORGE - CONCERVATION PARK

COX CREEK
GOLF COURSE
HEYSEN TRAIL

WASTEWATER GENERATED AT PERFUMERY TO BE COLLECTED INTO SMALLER SEPTIC TANK LOCATED AT THE PERFUMERY AND THEN PUMPED TO HOLDING TANK

PROPOSED GRAVITY SEWER FROM HOTEL, GOLF AND POD FACILITIES TOWARDS SEPTIC TANK SIZED TO MEET SA HEALTH REQUIREMENTS.

EFFLUENT TO BE CONVEYED INTO HOLDING TANK, AND PUMPED AT APPROVED FLOW RATE VIA RISING MAIN TO EX. ADELAIDE HILLS COUNCIL PUMP STATION PS-2. HOLDING TANK, PUMP SPECIFICATION TBC IN CONJUNCTION WITH PUMP STATION UPGRADE DISCUSSIONS WITH ADELAIDE HILLS COUNCIL.

EXISTING ADELAIDE HILLS RISING MAIN PS1 TO PS2

EXISTING ADELAIDE HILLS COUNCIL STIRLING STEDS SYSTEM PUMP STATION 2 - PS2.

UPGRADE EXISTING PUMPS TO NEW PUMPS CAPABLE OF 3 L/S. NO MODIFICATION TO EMERGENCY STORAGE BELIEVED TO BE REQUIRED.

EXISTING ADELAIDE HILLS RISING MAIN CONVEYING FLOWS SOUTH TO SA WATER TREATMENT PLANT

EXISTING ADELAIDE HILLS COUNCIL PUMP STATION - PS1 .

PS1 PUMPS TO PS2

For Review
8/03/2023 4:09:33 PM

Preliminary Wastewater proposal
FMG Engineering
28.03.2023

Jordan Colbert

From: Kim Krieg <kkrieg@ahc.sa.gov.au>
Sent: Friday, 24 March 2023 7:13 AM
To: Jordan Colbert
Cc: Ari Mudugamuwa
Subject: Stirling Golf Course Development
Attachments: RE_ MLGE - Preliminary Wastewater discussions current proposal.eml

Hi Jordan,

Thanks for the chat yesterday regarding the above development. I can confirm that Council has in principle support for the proposed development including upgrade to Council's Golflinks Rd CWMS pump station 2 infrastructure located opposite Golflinks Court, Stirling. The developer will be responsible for all augmentation charges associated with the proposed pump station 2 upgrade and must seek approval from SA Water to discharge into their infrastructure.

Once the application is lodged further discussions can take place regarding the necessary upgrade.

Kind regards

Kim

Kim Krieg (Pearson)
Community Wastewater Management System (CWMS) Technical Officer
Adelaide Hills Council

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e kkrieg@ahc.sa.gov.au
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Appendix C

Stormwater Assessment Report

ENGINEERING

Stirling Golf Course

Stormwater Management Plan

JOB NUMBER:	S53897 - 275203; 282604
CLIENT:	Venture Capital Developments Pty Ltd
SITE:	Stirling Golf Club, 35 Golflinks Road, STIRLING, SA 5152
DATE:	1/12/2022
REVISION:	C

Document Status

REV NO.	STATUS	AUTHOR	REVIEWER			APPROVED FOR ISSUE		
			NAME	SIGNATURE	DATE	NAME	SIGNATURE	DATE
0	For Lodgement	J Colbert	Jeremy Clapp	JHC	28.11.2021	Jordan Colbert	JTC	28.11.2021
1	For Approval	J Colbert	Jeremy Clapp	JHC	24.11.2022	Jordan Colbert	JTC	24.11.2022
2	For Approval	J Colbert	Jeremy Clapp	JHC	1.12.2022	Jordan Colbert	JTC	1.12.2022

Table of Contents

Introduction

FMG Engineering has been engaged by Venture Capital Developments Pty Ltd to undertake a preliminary stormwater assessment and develop a preliminary Stormwater Management Plan for a proposed development of the Stirling Golf Club. The Stirling Golf Course is located in the Adelaide Hills approximately 18km south east of the Adelaide CBD between Stirling and Bridgewater and is situated on the north side of the South Eastern Freeway. T

This preliminary Stormwater Management Plan describes the assessment undertaken and addresses the requirements provided by Adelaide Hills Council's engineering and planning departments.

Site Description

The site is located at 35 Golflinks Rd, Stirling SA 5152 as shown in Figure 1. The site is bounded by Old Carey Gully Rd to the North West, Golflinks Rd to the South West and Mount George Conservation Park to the East and South East. The Golf Course is surrounded by several land use zones including Country Living, Watershed (Primary Production) and Public Purpose zones.

The Cox Creek runs through the site in a south easterly direction. The site is undulating with a general downwards slope towards the south east. The catchment area of the Cox Creek upstream of the Golf Course has been estimated using local contour data available in NatureMaps.

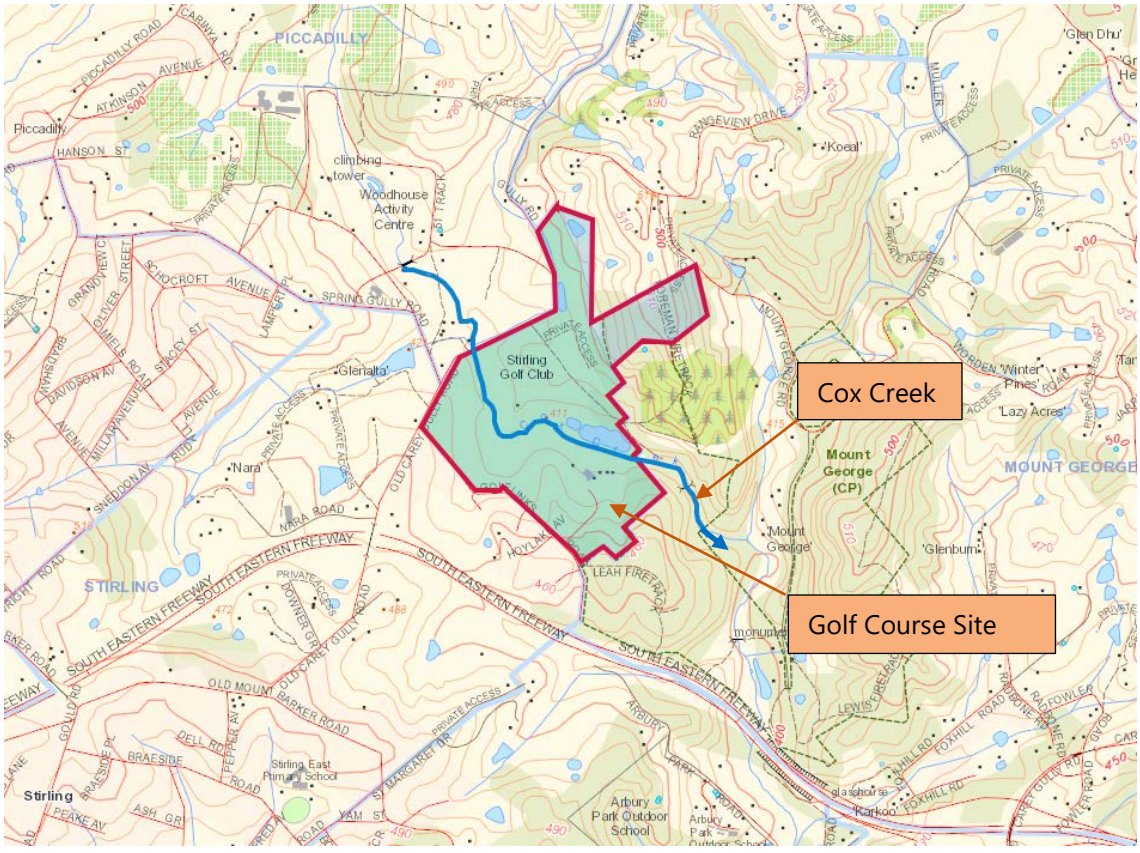


Figure 1 - Site locality plan (Nature Maps)

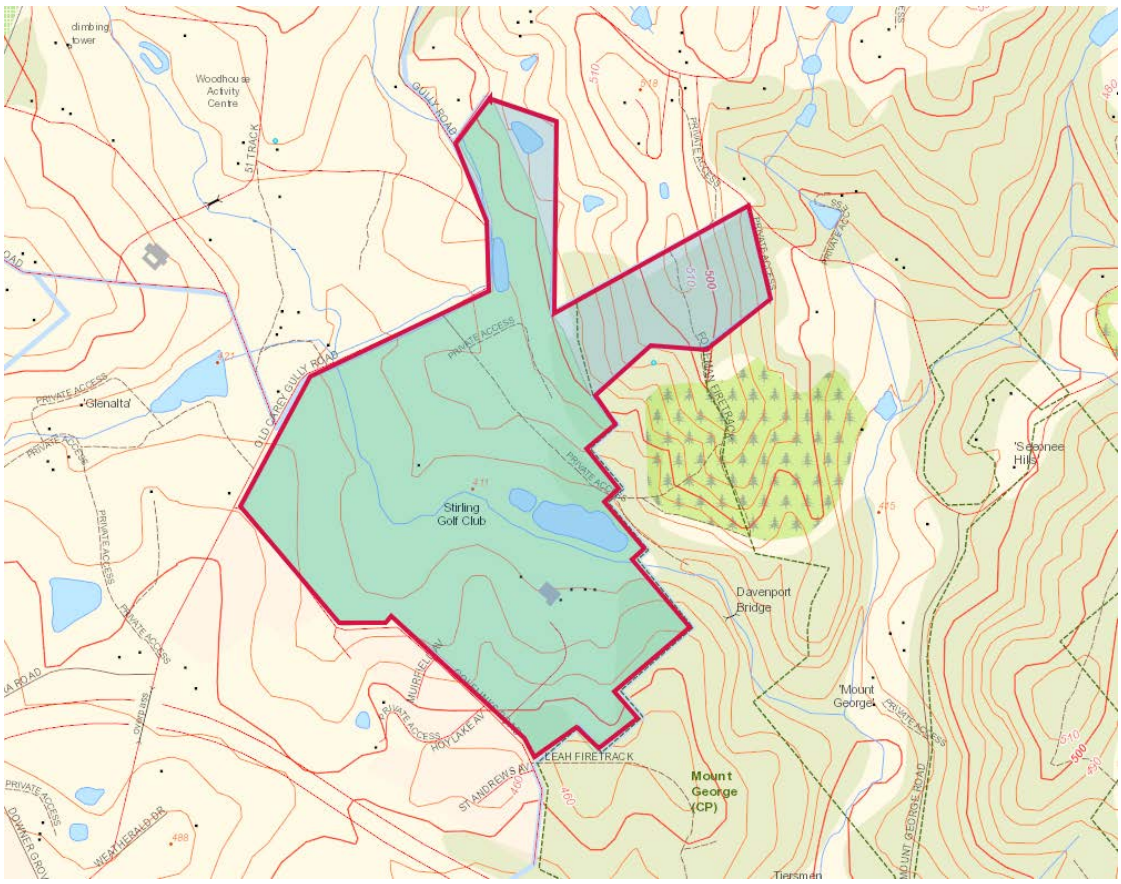


Figure 2 – Golf Course site plan (Nature Maps)

Proposed Development

The proposed development plan for this site includes ;

- Hotel - 3-5 level hotel building comprising:
    - 56 hotel suites.
    - 15 x two bedroom serviced apartments.
    - 15 x three bedroom serviced apartments.
    - 2 penthouse serviced apartments.
    - Back of house, plant storage and maintenance areas.
    - A 537m2 function room.
    - A 212m2 restaurant with 89 m2 external terrace.
    - 186m2 sports bar.
    - A 189m2 gallery and cafe.
    - A 94m2 wellness centre with 125m2 gym and spa/massage treatment rooms.
- Private retreats – 'Pods'
    - 17 x one bedroom units.
    - 1 x back of house Service Pod.
- Adaptive reuse of the existing perfumery:

    - Refurbishment of the existing local heritage place to accommodate a multipurpose space for use as café, retail or functions.
    - Extension to the Perfumery to include a covered outdoor dining area.
    - Orchard and perfumery garden plantings to reimagine the former use of the building as a "Scent Factory".
    - Note: the perfumery building will temporarily house the golf club whilst construction is occurring.
- Golf Course Facilities Building - 2-5 level building comprising:
    - Retention of 18-hole golf course with improvements.
    - Refurbished function facilities, cart storage and 138m2 clubhouse in new building.
    - New 97m2 pro-shop, administration areas, gym and change rooms.
- Car Parking, Access and Waste Management
    - A total of 200 car parking spaces in two car parking areas.
    - Emergency vehicle access via western entry from Golflinks Road.
    - Main access point via Golflinks Road.
    - Designated service bay for waste collection and service vehicles.
    - Porte cochere and valet area for guests and buses.
    - A separate entry from Old Carey Gully Road to provide maintenance vehicle access and public access to the perfumery building.
- Designated waste storage areas.
    - Subdivision – following construction of the proposed development, it is proposed to divide the site into three (3) allotments:
    - Allotment 532, with an approximate area of 9,924m2 together with a right of way 'A', comprising the hotel building and pods.
    - Allotment 533, with an approximate area of 5,056m2 together with a right of way 'B', comprising the golf club and facilities building.
    - Allotment 531, with an approximate area of 38.4 hectares, comprising the balance of the golf course, subject to easements 'A' and 'B'.

The current building and carpark facilities situated up the hill and to the south west of the lake have a total hard surface area of approximately 5,000m^2. Preliminary measurements indicate that the proposed development buildings and carparks have a total hard surface area of approximately 8,300m^2. This increased hard surface area of 3,300m^2 represents <1% of the golf course area.

Stormwater Management

Current Site Drainage

Cox Creek enters the golf course site from the north as it passes under Old Carey Gully Road and runs through the site in a south easterly direction. The creek exits the site to the east, continues in a south easterly direction and passes under the South Eastern Freeway approximately 1,250m downstream of the site.

Preliminary investigations indicate the catchment area of Cox Creek upstream of the site exit point is approximately 2,000Ha. This catchment area includes sections of Summertown, Carey Gully, Crafers and Piccadilly and includes residential, primary production and public purpose land use areas. The approximate catchment area of Cox Creek upstream of the golf course site is shown in Figure 3.

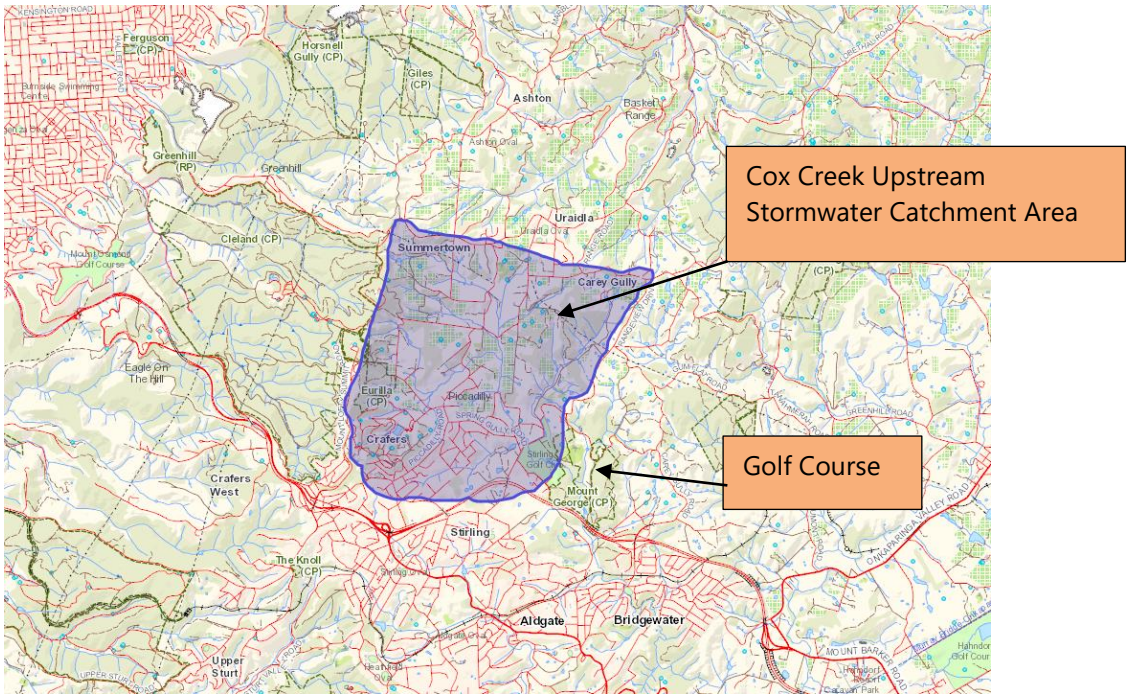


Figure 3 – Approximate Upstream Catchment Area of Cox Creek (Nature Maps)

BOM Rainfall data for Piccadilly Station 23891 indicates an average annual rainfall of 1068mm with the highest rainfalls occurring in the winter months as expected. A summary of the previous 20 years of data is provided in Table 1.

Table 1 – Piccadilly Rainfall Data Summary

Month	Mean (mm)	5th percentile (mm)	95th percentile (mm)
Jan	37.5	11.2	81
Feb	34.6	1.3	83.9
Mar	38.6	11.7	80.3
Apr	68.9	6.6	167.2
May	133.3	68.3	191.1
June	149	19.2	226.1
July	160.6	66.6	276.6
Aug	147.9	43.6	243
Sep	119.4	48.5	222.8
Oct	68.1	2.8	179.4
Nov	51.5	13.8	120.7
Dec	53.3	20.1	141.5
Annual	1068.6	933.1	1227.4

Source: BOM Rainfall Data 2001 – 2020 Piccadilly Station 23891

Stormwater Management Requirements

This stormwater management plan will address the following State Planning Commission requirements (with other items within the specialist reporting provided by others);

- Integrated Water Management Plan (IWMP);
    - Infrastructure for the storage and treatment of stormwater
    - Predicted stormwater generation volumes and details of stormwater quality improvements, including the location and sizing of the bio-retention swales and basins, anticipated quality improvements and details of any other proposed stormwater quality treatment features.
    - Whole site, upstream catchment and downstream stormwater discharge point
    - (balance of IWMP provided by others reporting)
- Demonstration of no stormwater nuisance or flooding to occur on downstream properties due to the development
- Compliance with Council and Natural Resource Management Board requirements

It is noted that a surface water management plan has been included within the Construction Environmental Management Plan (CEMP) prepared by FMG as a separate report.

Adelaide Hills Council Stormwater Drainage Design Guidelines for Submission of Engineering Plans for New Developments require the following to be considered;

- The designer ensure that the proposed development within the drainage reserves such as fences of facilities shall not obstruct the path of flows from major storm events
- The major drainage network shall have the capacity to control stormwater flows under normal and minor system blockage (50% blockage) conditions for an ARI 1 in 100 years
- The drainage system shall be designed to ensure that the landform of watercourses is stabilised and that erosion is minimised
- All dwellings must be protected from inundation during a flood of 1 in 100years ARI
- The drainage system shall be designed to ensure that flows downstream of the site are restricted to pre-development levels, unless council approves increased flows
- Underground stormwater systems designed to convey the minor 1 in 10 year ARI storm event
- Minimum 300mm freeboard to the 100 year ARI flood / ponding level

Further to the above, FMG recognises the sensitive urban environment the proposed development is located within, and following feedback from the EPA during pre-lodgment meetings, understand there to be a need for a tertiary level stormwater quality system to be implemented on site which fully complies with the South Australian EPA water quality reduction targets for runoff generated by the development;.

- 80% retention of the typical urban annual load for Total Suspended Solids (TSS)
- 60% retention of the typical urban annual load for Total Phosphorus (TP)
- 45% retention of the typical urban annual load for Total Nitrogen (TN)
- 100% retention of the typical urban annual load for Gross Pollutants (litter)

Stormwater Assessment

Proposed Development Drainage

Stormwater drainage of the golf course facilities situated to the south west and uphill of both Cox Creek and the existing dam / lake observed on site. Lake levels are managed through pumping of stormwater local storage ponds throughout the golf course, and is utilised for irrigation. Peak levels within the lake are managed via a weir which spills into Cox Creek when full.

Surface run off from the subject development area, and further upstream catchments drains into open drains associated with the carpark retaining wall and runs into entry pits and underground stormwater pipes. This runoff is currently diverted towards Cox Creek.

It is envisaged that where possible, existing drainage pits and pipes will be retained to minimise the construction impact of the development. Generally, the new stormwater pit and pipework will be laid within the building footprint and collect all rainwater runoff for storm events up to the minor storm event (10 year ARI) into a below ground drainage pipe. Major storm events which exceed the drainage pipe capacity will travel overland towards the north. Roof runoff will be collected into downpipes and conveyed into a rainwater retention tank (designed and documented by others with water balance calculations to support) with 100 year ARI overflows connected into the below ground outlet drain.

Discharge from the underground drain, and major storm overland flow will be conveyed into a new detention and water quality improvement stormwater basin located adjacent Cox's creek. The stormwater basin will be sized during detailed design to achieve the following performance requirements;

- Approximately 150m^3 detention storage with a staged flow control (i.e. dual orifice control or similar) over the outfall to Cox's creek to limit post-development flow rates to pre-development flow rates. Detention volume will be calculated and adjusted as necessary to ensure peak outflows do not exceed pre-development flow rates for the minor and major storm events respectively.
- Minimum 300mm freeboard from peak 1% AEP storm event basin water level, to emergency overflow weir to Cox creek
- Provision of 300mm of extended duration detention depth, sized to capture and treat the 3mo ARI (4EY AEP) storm event for all runoff from the ground surface areas of the basin.
- Provision of 200micron stormwater filter baskets within all stormwater inlet pits within the development to remove
- Basin floor to be planted with effective nutrient removal native vegetation, deep filter media, transition layers and drainage layers in accordance with EPA / Water Sensitive SA best practice guidelines.
- Provision of a emergency overflow to Cox creek via a rock lined weir or similar approved to mitigate erosion and protect the existing watercourse in the event of a blockage.

Internal drainage pipe capacity requirements will be determined during detailed design of the proposed development, however as a minimum requirement all below ground pipes will be designed to ensure conveyance of the 10% AEP (10 year ARI) storm event, and a minimum pipe diameter of 225mm to mitigate the likelihood of blockages in this environment.

A plan showing the stormwater concept, with bulk elevation estimates and earthworks renders is included as an appendices to this report.

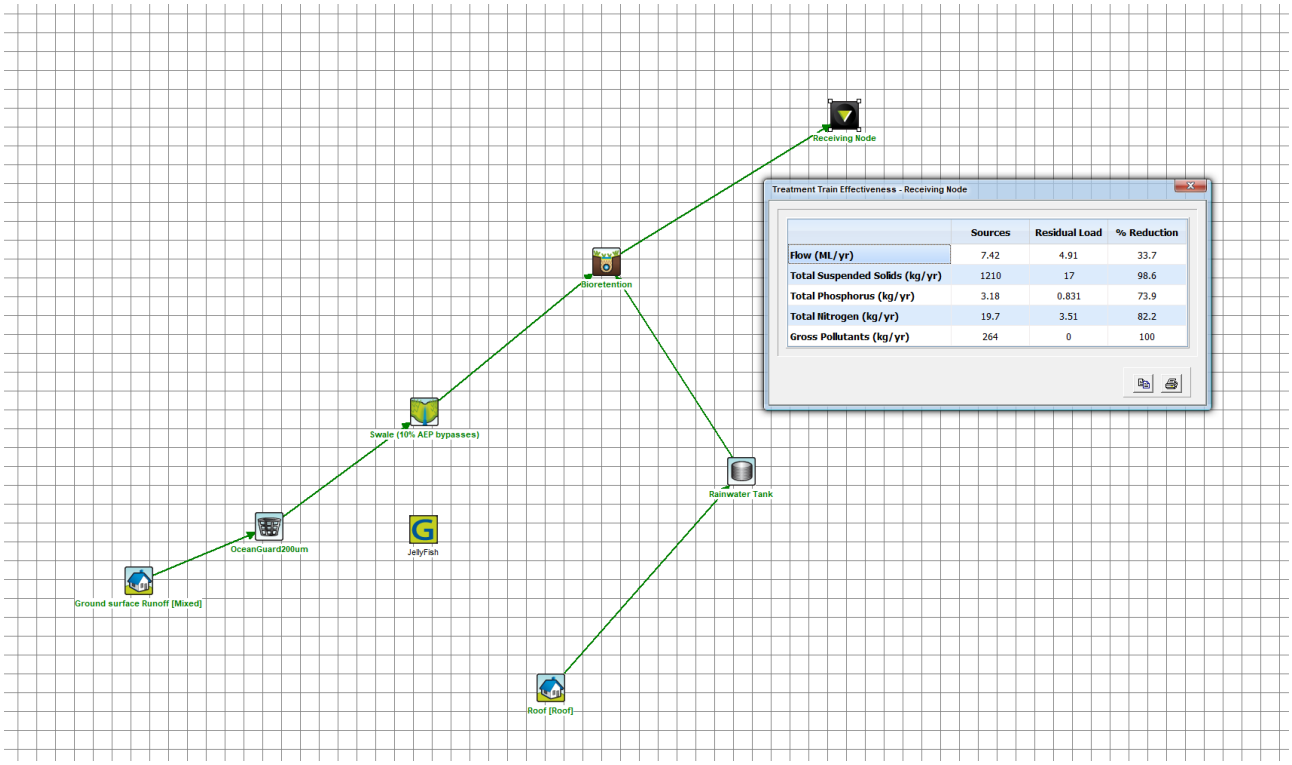
Pod accommodation

Individual pod accommodation will adopt a similar stormwater drainage scheme, with retention / detention tanks provided to each individual pod as a self sufficient unit. Discharge from these tanks will be managed via either a main collector pipe, or individual discrete outlets to the bushland which will be suitably controlled via orifice and erosion protection elements.

Roof areas approximate 70m2 resulting in the need for 1-1.5m3 of stormwater detention volume per pod to restrict post-development runoff to pre-development runoff.

Music modelling results

A Music model was developed to assess the reduction in pollutants based on the proposed treatment train consisting of bioretention raingardens and grassed roadside swales. This assessment was undertaken in accordance with the Water Sensitive SA MUSIC modelling guidelines. The results of the model can be seen in Figure 9 with a summary of reductions shown in Table 1. A filter cartridge based device was considered (Jellyfish) however was not necessary to achieve adequate water quality improvements.



Pollutant	Water Sensitive SA Target	Reduction achieved
Total Suspended Solids	80%	98.6%
Total Phosphorous	60%	73.9%
Total Nitrogen	45%	82.2%
Gross Pollutants	90%	94.1%

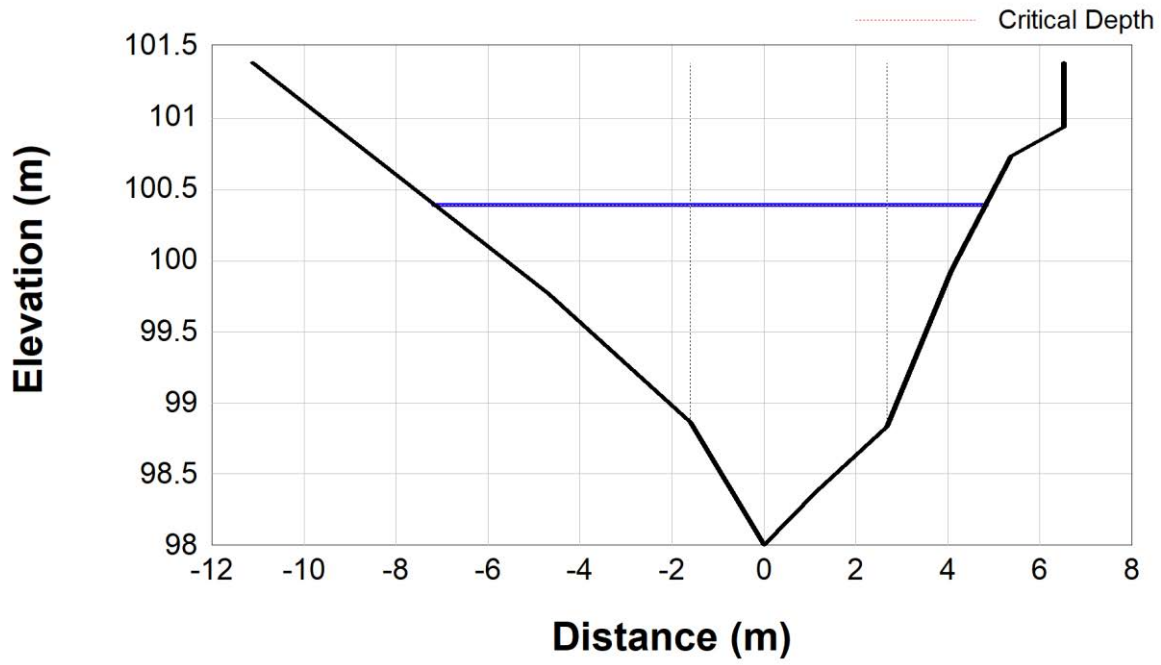
Table 1 – Summary of MUSIC model results

Cox Creek Preliminary Drain Model

A preliminary stormwater assessment was undertaken to assess required floor levels for the proposed development. The following parameters were used to develop a preliminary Drain Model using an extended rational model.

- Upstream catchment area of 2,115Ha
- Impervious area 10%, pervious area 90%
- Flow in 1% AEP major storm event of approximately 47.5m^3/s
- Irregular channel cross section based on contour data

Calculations indicate the water depth in Cox Creek and the associated lake may approach 2.5m increase in height with a maximum velocity of 5m/s during a 1% AEP major storm event. According to contour plans, Cox Creek is at an elevation of approximately 412m AHD at the location directly downhill from the proposed development. The proposed development area is at an elevation between 418m – 420m AHD which is 6m-8m above the creek. An increase in creek level of 2.5m would not impact the floor level of the proposed development. The preliminary creek cross section showing an increased water level of 2.5m is provided in Figure 4.



Note that the creek invert on the model is an arbitrary datum. Elevation 98 equates approximately to the Cox Creek invert level of 412m AHD (from contour plans)

Figure 4 – Cox Creek Cross Section Preliminary Stormwater Assessment

Conclusion

This Preliminary Stormwater Management Plan has been prepared prior to detailed design and outlines the general intent for managing stormwater runoff from the site. The requirements set out in this document should be adhered to within final detailed design to ensure compliance with the requirements of the Adelaide Hills Council and EPA.

Specifically, site stormwater should be retained and detained on site to ensure post development peak flows do not exceed pre-development peak flows for an equivalent storm event. Furthermore, management and reduction of pollutants within stormwater runoff is of high importance within this sensitive environment, and EPA water quality targets must be adhered to.

Minimum finished floor levels shall be 300mm above the maximum flood level within Cox Creek, which is estimated at 414.5m AHD. Concept site plans suggest this will be easily incorporated with all structures sited around the existing development at 419-420m AHD.

Detailed stormwater design including MUSIC and DRAINS modelling will be completed to verify the performance of the drainage network in meeting the retention/detention and water quality parameters in line with Adelaide Hills Council and EPA requirements.

Appended;

C110 Perspective Images

C120 Earthworks Plan

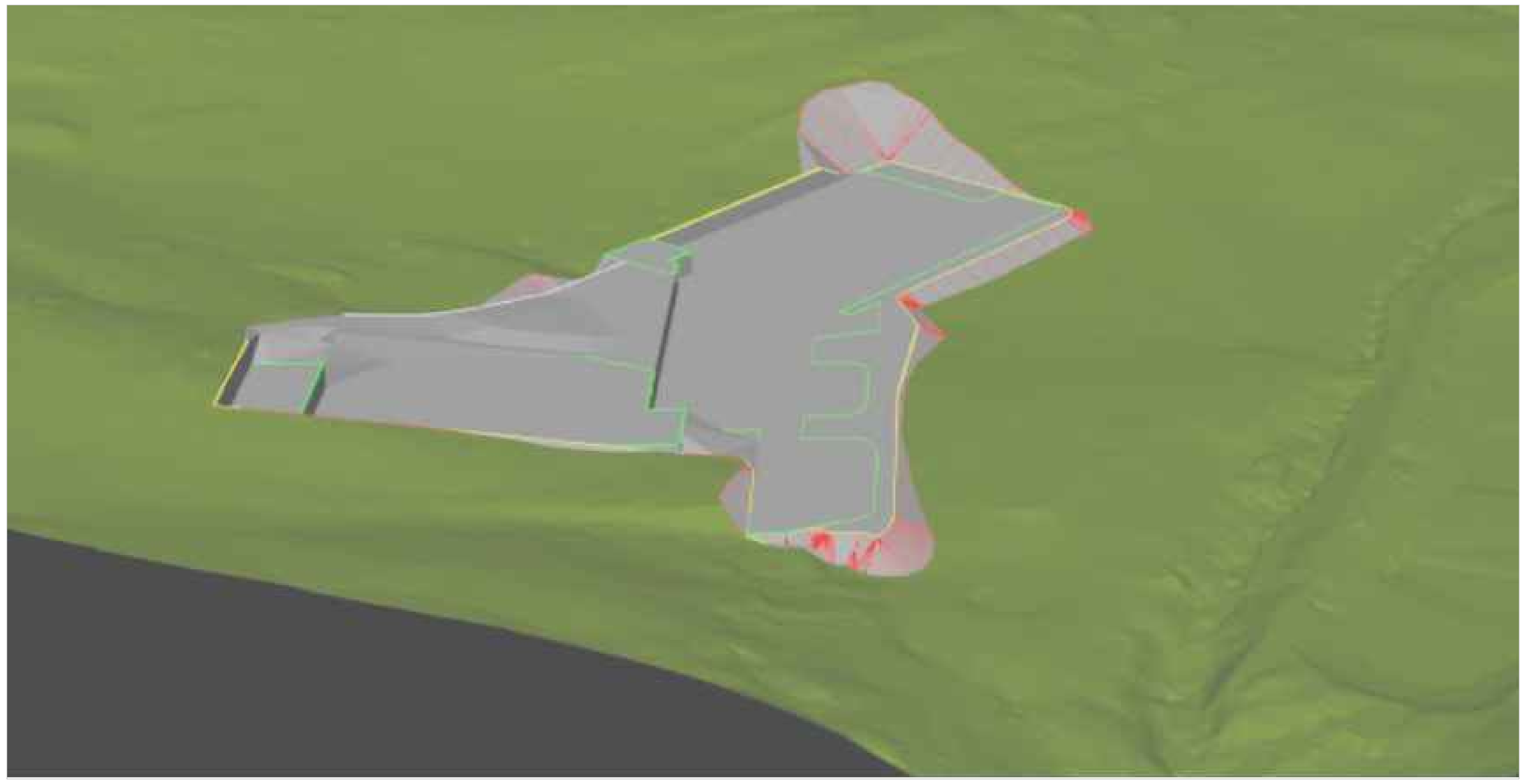
C130 Stormwater Management Plan

NORTH ELEVATION

SCALE NTS

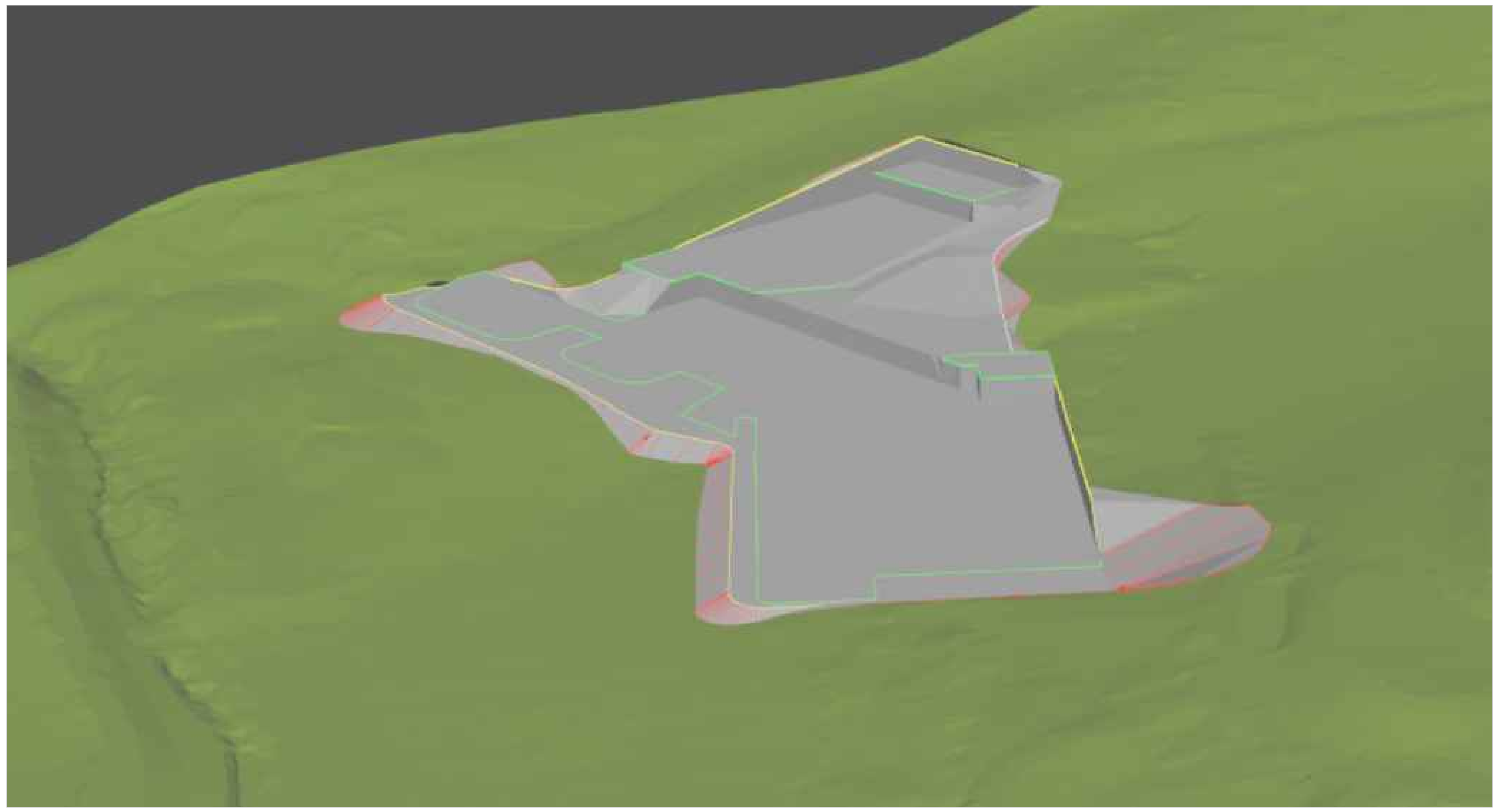
SOUTH ELEVATION

SCALE NTS



EAST ELEVATION

SCALE NTS



WEST ELEVATION

SCALE NTS

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

REV	DESCRIPTION	DATE	INIT	APP
A	PRELIMINARY ISSUE	23.09.2022	JS	JC

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P 08 8132 6600 57 Greenhill Rd, Wayville SA 5034

ABN 58 083 071 185
Quality Management Systems ISO 9001 Certified

FMG ENGINEERING

SIGNATURE

CLIENT	VENTURE CAPITAL DEVELOPMENTS PTY LTD
PROJECT TITLE	MOUNT LOFTY GOLF ESTATE
SITE ADDRESS	35 GOLFLINKS RD, STIRLING SA
DRAWING TITLE	PERSPECTIVE IMAGES
DESIGNED	JS
DRAWN	JS
CHECKED	JC
No. OF SHEETS	-
SCALE	NTS
DATE STARTED	23.09.2022
SITE ID & JOB No.	S53897_282604
DRAWING No.	C110
REV.	A

S53897_282604_C001 (ID 29536443).DWG (LAST SAVED ON 28/09/2022 11:43:12 PM). PLOTTED ON 28/09/2022 11:44:11 PM BY JORDAN COLBERT

N

INDICATIVE EARTHWORKS VOLUMES:
CUT = -15871m3
FILL = 2978m3
NET = 12892m3 EXCESS OF CUT OVER FILL

ASSUMPTIONS:
- 100mm TOPSOIL STRIP
- COMPACTION/EXPANSION FACTORS IGNORED
- VOLUMES TO FINISHED LEVELS, NO ALLOWANCE FOR SLAB, FOOTINGS OR BENCHING AT THIS TIME.

NOTE:
CUT/FILL VOLUMES ARE UNRELIABLE & CONTRACTOR SHALL UNDERTAKE THEIR OWN DUE DILIGENCE TO DETERMINE SUITABLE EARTHWORKS ALLOWANCES.

EARTHWORKS LEGEND

- EXTENT OF EARTHWORKS CUT (red)
- EXTENT OF EARTHWORKS FILL (green)

SCALE 0 4 8 12 16 20 METRES

PRELIMINARY ISSUE
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REV	DESCRIPTION	DATE	INIT	APP
A	PRELIMINARY ISSUE	23.09.2022	JS	JC

CONTRACTORS MUST SET OUT ALL WORK AND VERIFY ALL CONDITIONS, LEVELS AND DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF ANY WORK OR MAKING OF ANY SHOP DRAWINGS WHICH MUST BE SUBMITTED AND APPROVED PRIOR TO ANY MANUFACTURE.

ALL WORK MUST BE EXECUTED IN ACCORDANCE WITH THE RULES, REGULATIONS, BY LAWS AND REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION OVER ANY PART OF THE WORK.

ELECTRONIC COPIES OF THIS DRAWING ARE NOT TO BE USED FOR DIMENSIONAL SETOUT.

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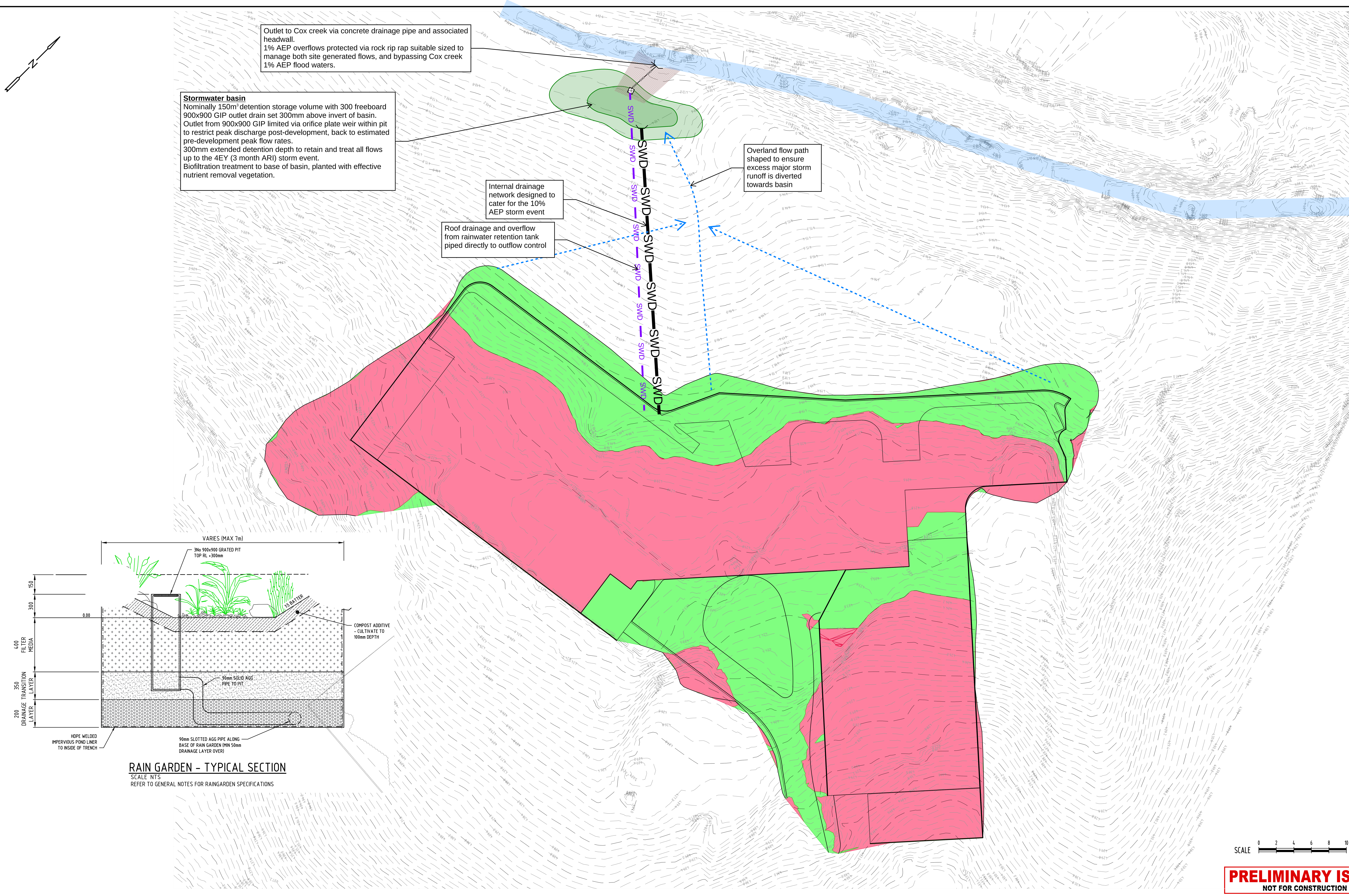
SIGNATURE

CLIENT: VENTURE CAPITAL DEVELOPMENTS PTY LTD		DESIGNED: JS	DRAWN: JS
PROJECT TITLE: MOUNT LOFTY GOLF ESTATE		CHECKED: JC	No. OF SHEETS: -
SITE ADDRESS: 35 GOLFLINKS RD, STIRLING SA		SCALE: 1:400 AT A1	DATE STARTED: 23.09.2022
DRAWING TITLE: EARTHWORKS PLAN		SITE ID & JOB No.: S53897_282604	REV.: A
		DRAWING No.: C120	

DRAWING M:\FMG\ID2\B20B1909-4257-4414-8350-1A82A9751CEE\0\29536000-29536999\29536443\L\L\S53897_282604_C001 (ID 29536443).DWG (LAST SAVED ON 28/09/2022 11:43:12 PM). PLOTTED ON 28/09/2022 11:44:10 PM BY JORDAN COLBERT



RAIN GARDEN - TYPICAL SECTION

SCALE NTS

REFER TO GENERAL NOTES FOR RAINGARDEN SPECIFICATIONS

PRELIMINARY ISSUE
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REV	DESCRIPTION	DATE	INIT	APP
A	PRELIMINARY ISSUE	28.09.2022	JS	JC

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PROJECT TITLE: MOUNT LOFTY GOLF ESTATE		CHECKED: JC	No. OF SHEETS: -
SITE ADDRESS: 35 GOLFLINKS RD, STIRLING SA		SCALE: 1:400 AT A1	DATE STARTED: 23.09.2022
		SITE ID & JOB No.: S53897_282604	REV.
DRAWING TITLE: STORMWATER MANAGEMENT PLAN		DRAWING No.: C130	A

DRAWING M:\FMG\ID2\B20B1909-4257-4414-8350-1A82A9751CEE

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