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client:
ROMAN CATHOLIC TRUST CORP.
DIOCESE OF ROCKHAMPTON FOR
CATHOLIC EDUCATION - DIOCESE
OF ROCKHAMPTON

project:
PROPOSED ST. PETER'S CATHOLIC
KINDERGARTEN

drawing title:
EXISTING OVERALL SITE PLAN

| | | | | | |
|---------|------|-------------|--------|------|----|
| job no: | 2137 | drawing no: | SK-101 | rev: | P3 |
|---------|------|-------------|--------|------|----|



GENERAL NOTES

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SITE AREA

19 WARD STREET AREA
50 HENRY STREET AREA
COMBINED SITES AREA

19 WARD STREET SITE COVERAGE

EXISTING
PROPOSED

50 HENRY STREET SITE COVERAGE

EXISTING
PROPOSED

COMBINED SITES COVERAGE

EXISTING
PROPOSED

IMPERVIOUS AREA

MEASURED ON GROUND TO OUTLINE OF BUILDING ENVELOPES

COMBINED SITES IMPERVIOUS SURFACE AREA

EXISTING
PROPOSED

LANDSCAPE AREA

COMBINED SITES LANDSCAPE AREA

EXISTING
PROPOSED

scale @A3
1 : 200
1 : 400
0 5m 10m

PRELIMINARY

| REV. | DESCRIPTION | DATE |
|------|-------------|------------|
| 1 | ISSUED | 10/03/2021 |
| 2 | ISSUED | 10/03/2021 |
| 3 | ISSUED | 10/03/2021 |

TONY MADDEN ARCHITECTS

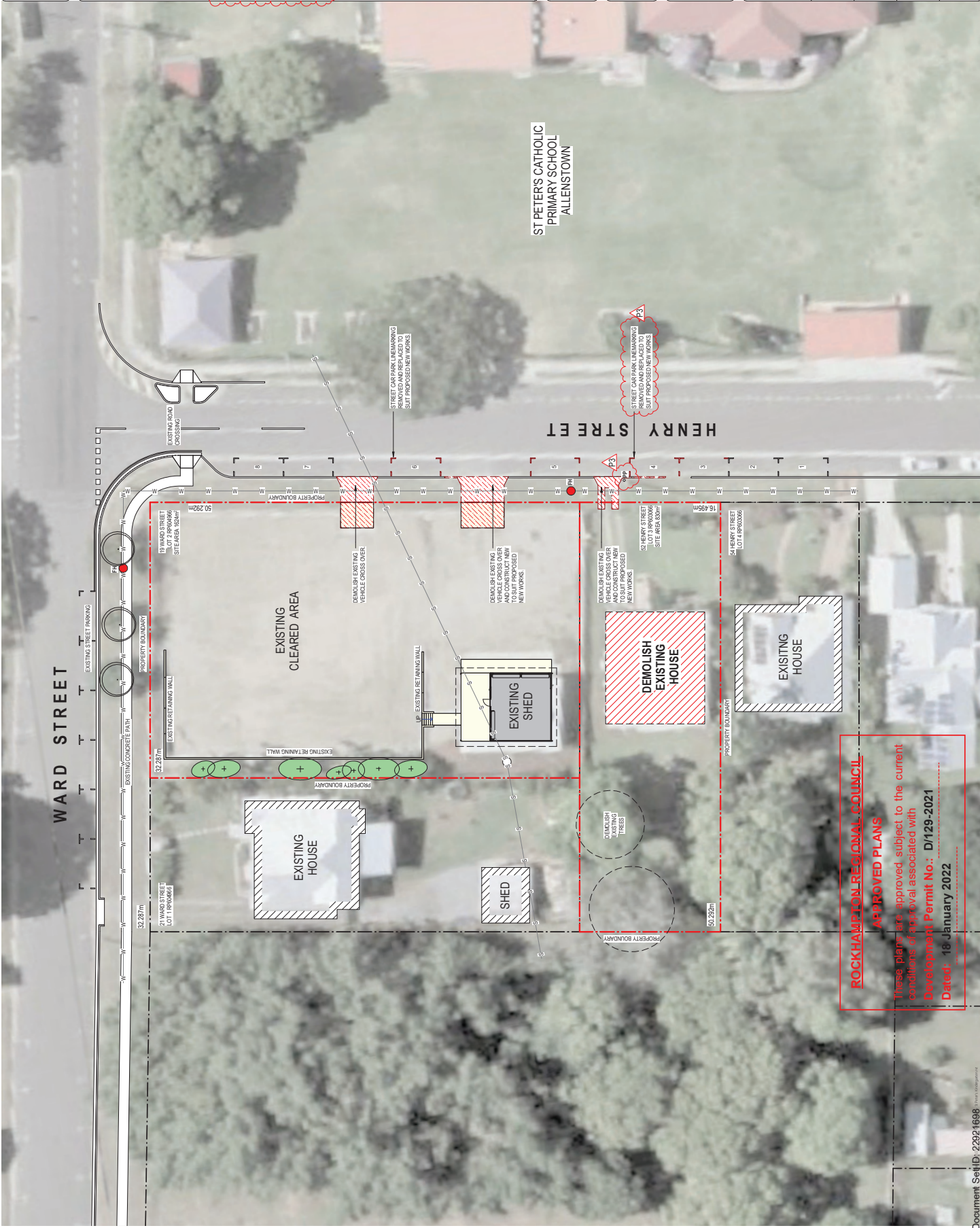
(07) 4622 8700
www.tony-madden.com.au

CLIENT:
ROMAN CATHOLIC TRUST CORP.
DIOCESE OF ROCKHAMPTON FOR
CATHOLIC EDUCATION - DIOCESE
OF ROCKHAMPTON

LOCATION:
CORNER OF WARD & HENRY
STREET, ROCKHAMPTON QLD. 4700

PROJECT:
PROPOSED ST. PETER'S CATHOLIC
KINDERGARTEN

| | | | |
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| drawing no: | 2137 | SK-102 | P3 |
| date: | | | |



ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

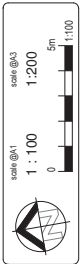
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Dated: 18 January 2022



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| REV. | DESCRIPTION | DATE |
|------|-------------|------------|
| 1 | ISSUED | 10/09/2021 |
| 2 | REVISED | 10/09/2021 |
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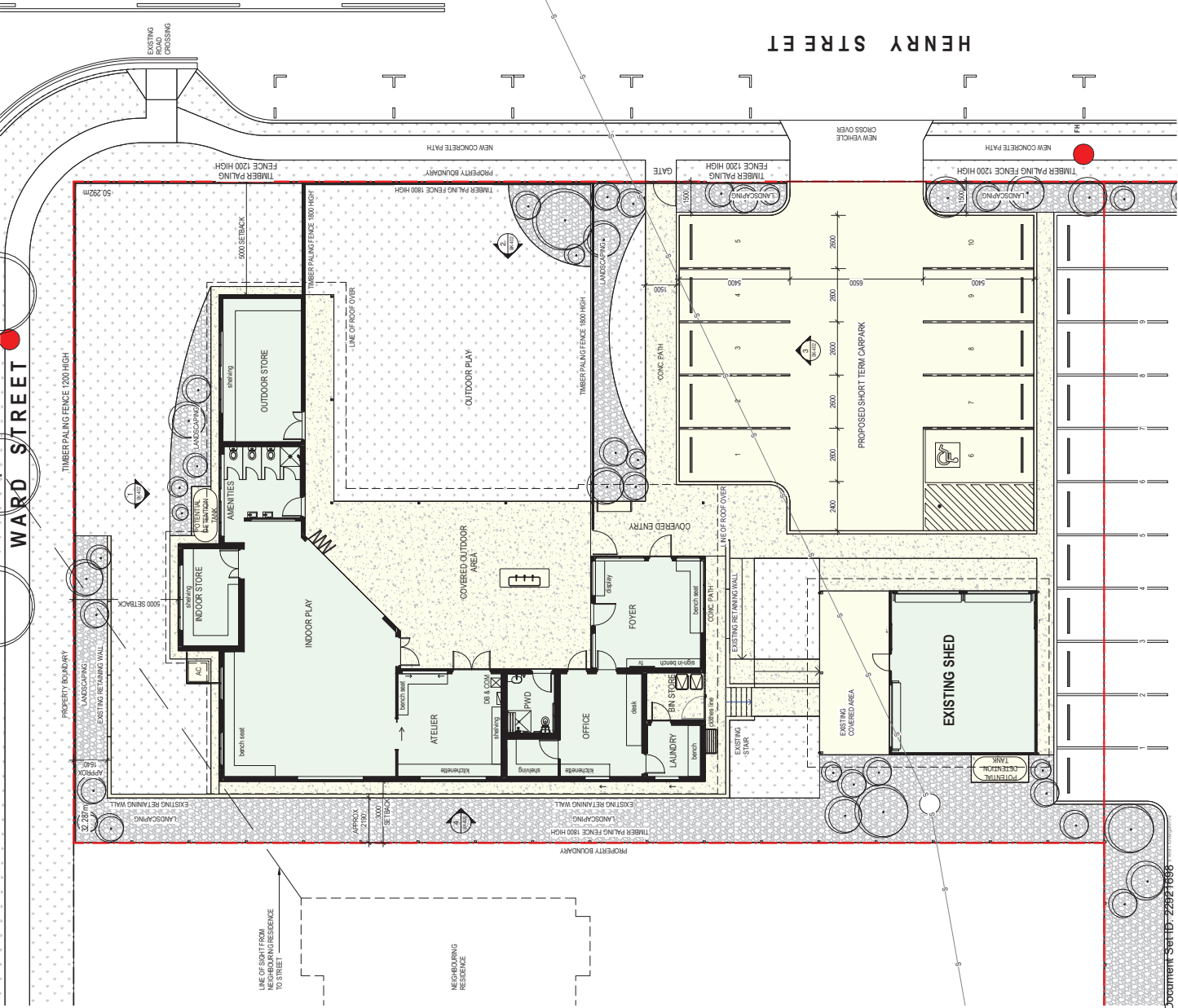
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CORNER OF WARD & HENRY
STREET, ROCKHAMPTON QLD, 4700

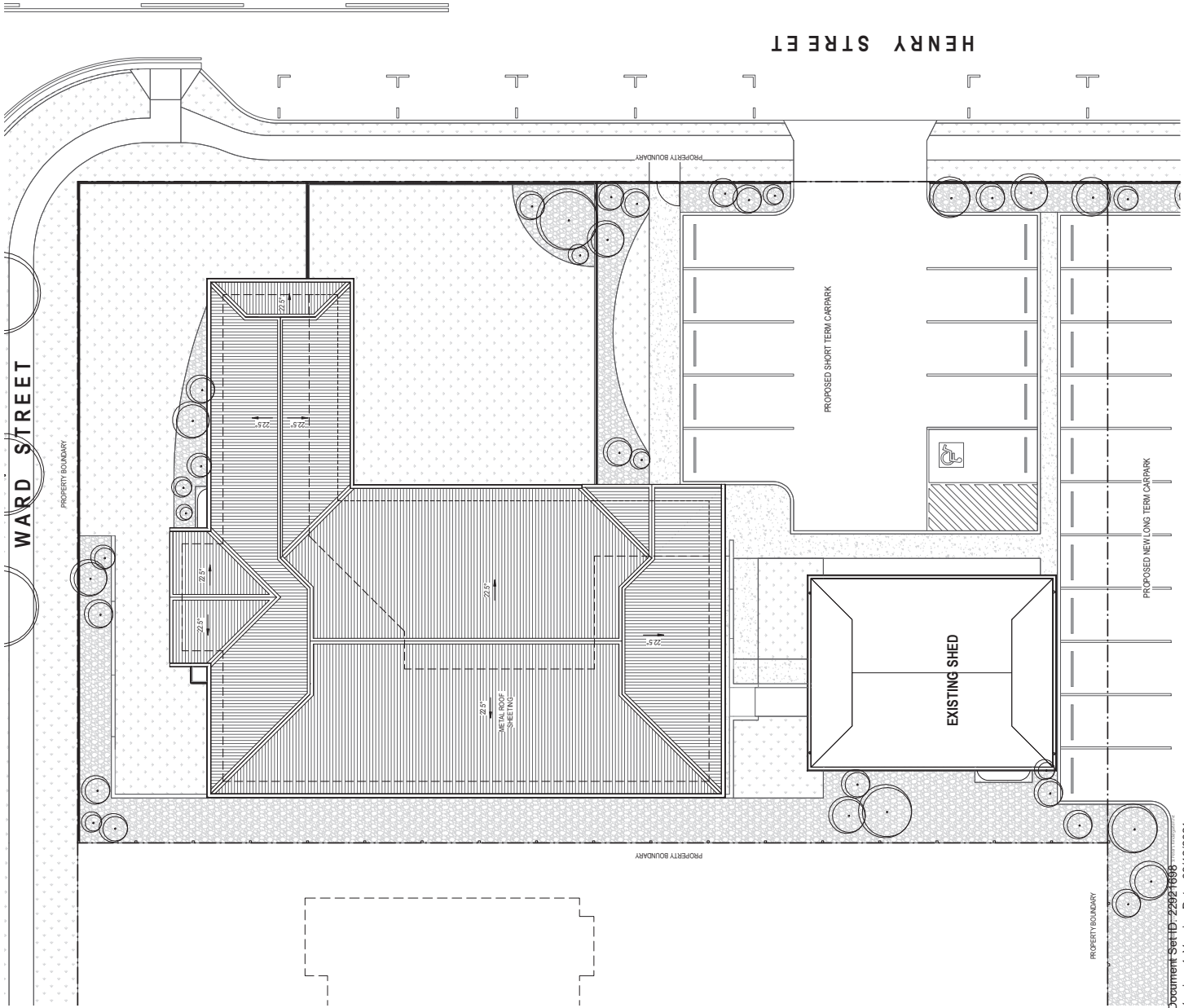
PROJECT:
PROPOSED ST. PETER'S CATHOLIC
KINDERGARTEN

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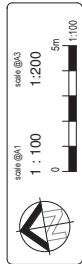
| PROPOSED KINDERGARTEN DEVELOPMENT |
|--|
| PROPOSED KINDERGARTEN GROSS FLOOR AREA (GFA): APPROX. 260sqm |
| EXISTING SHED GROSS FLOOR AREA (GFA): APPROX. 140sqm |
| TOTAL GROSS FLOOR AREA (GFA): APPROX. 350sqm |





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| PRELIMINARY | |
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| REV. | DESCRIPTION |
| 1 | ISSUED |
| 2 | ISSUED |
| 3 | ISSUED |
| 4 | ISSUED |
| 5 | ISSUED |



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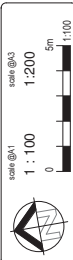
LOCATION: CORNER OF WARD & HENRY
STREET, ROCKHAMPTON QLD. 4700

PROJECT: PROPOSED ST. PETER'S CATHOLIC
KINDERGARTEN

| DRAWING NO. | |
|-------------|--------|
| 2137 | SK-302 |
| P3 | |

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| 2 | REVISED | 10/06/2021 |
| 3 | REVISED | 10/06/2021 |



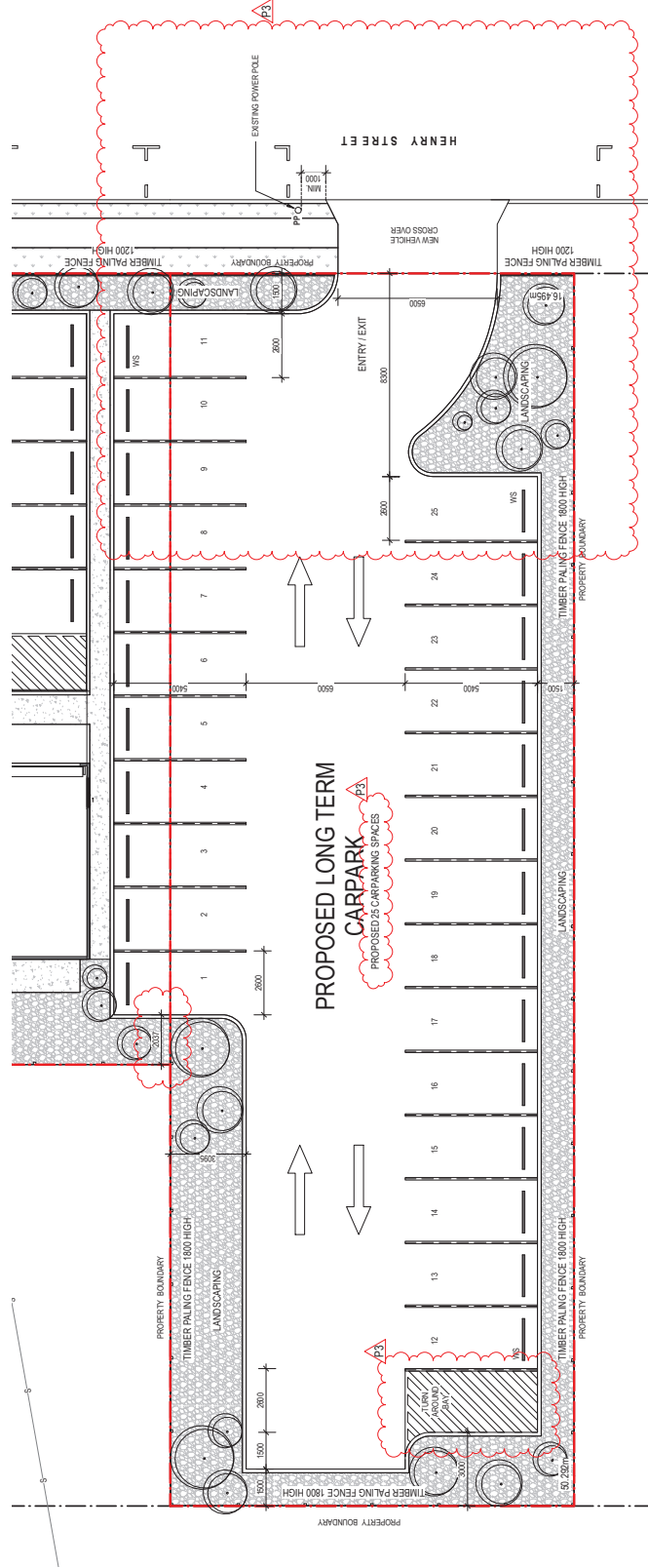
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DIOCESE OF ROCKHAMPTON FOR
CATHOLIC EDUCATION - DIOCESE
OF ROCKHAMPTON

LOCATION: CORNER OF WARD & HENRY
STREET, ROCKHAMPTON QLD. 4700

PROJECT: PROPOSED ST. PETER'S CATHOLIC
KINDERGARTEN

DRAWING TITLE: PROPOSED LONG TERM CARPARK
PLAN

| | | | | | |
|-------------|------|-------------|--------|------|----|
| DRAWING NO: | 2137 | DRAWING NO: | SK-303 | REV: | P3 |
|-------------|------|-------------|--------|------|----|



ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

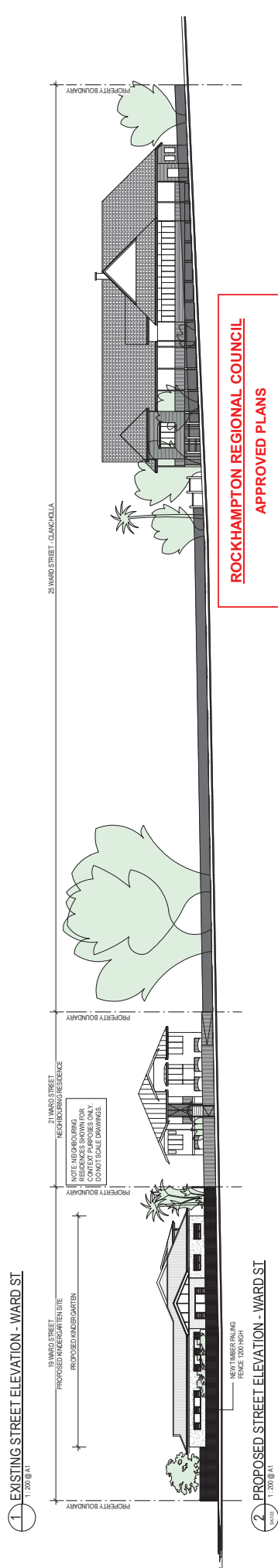
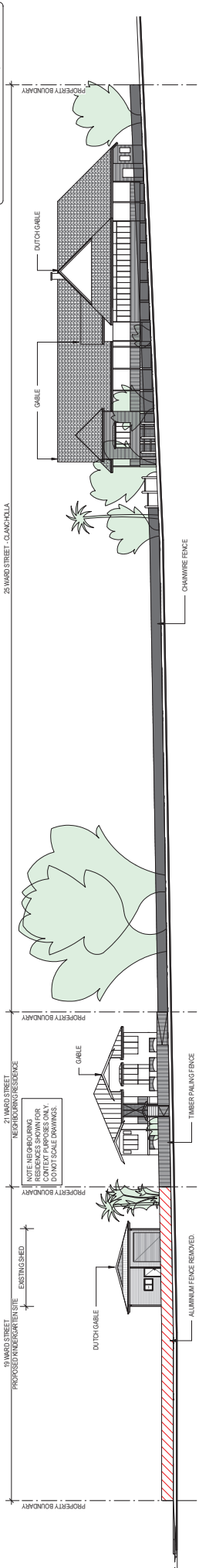
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Dated: 18 January 2022

GENERAL NOTES

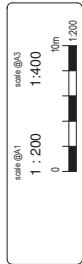
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| 1 | ISSUED | 10/01/2021 |
| 2 | ISSUED | 10/01/2021 |
| 3 | ISSUED | 10/01/2021 |

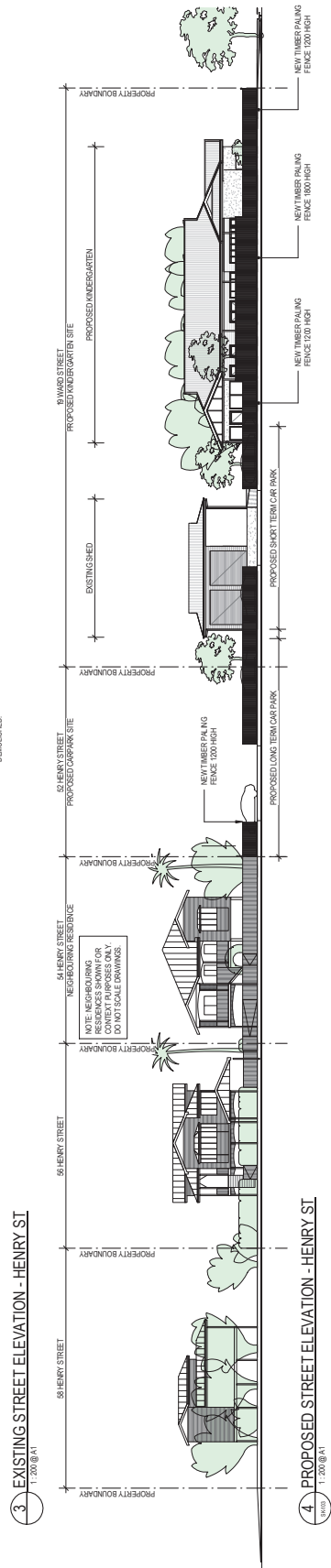
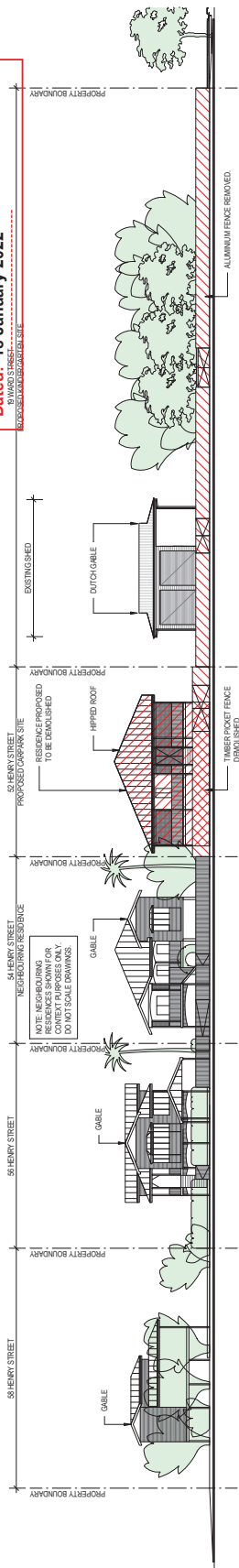
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CLIENT:
ROMAN CATHOLIC TRUST CORP.
DIOCESE OF ROCKHAMPTON FOR
CATHOLIC EDUCATION - DIOCESE
OF ROCKHAMPTON

LOCATION:
CORNER OF WARD & HENRY
STREET, ROCKHAMPTON QLD. 4700

PROJECT:
PROPOSED ST. PETER'S CATHOLIC
KINDERGARTEN

| DRAWING NO. | |
|-------------|--------|
| 2137 | SK-401 |
| REV. | |
| P3 | |



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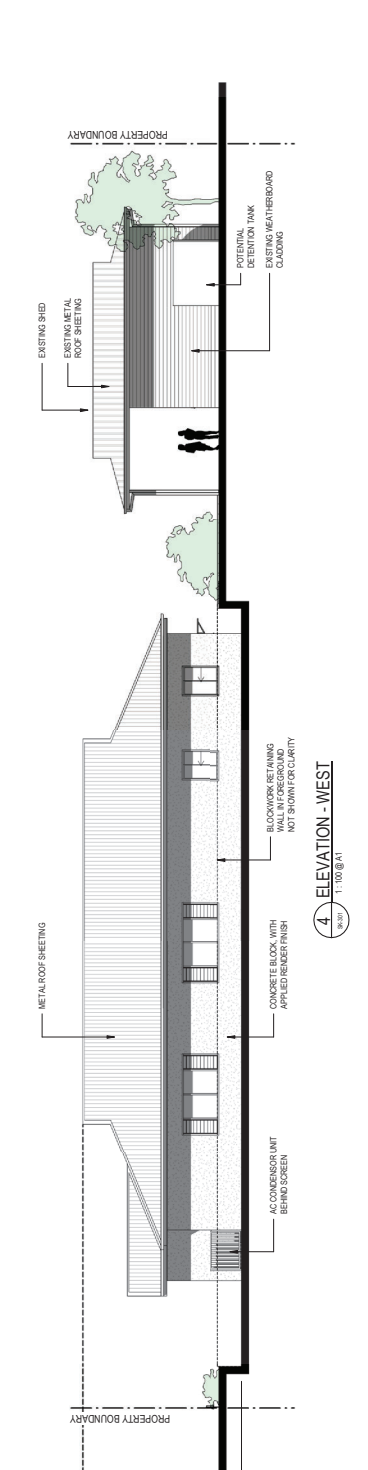
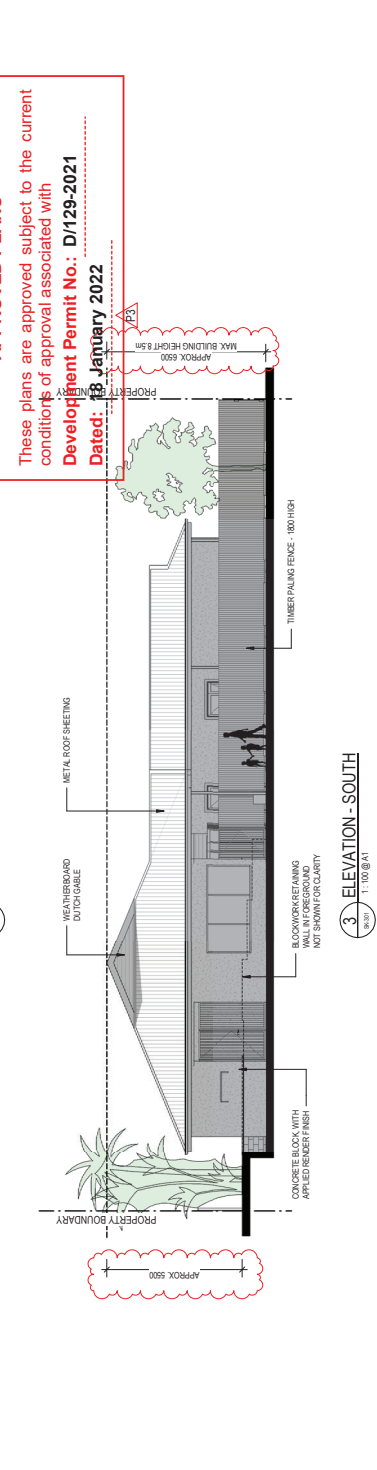
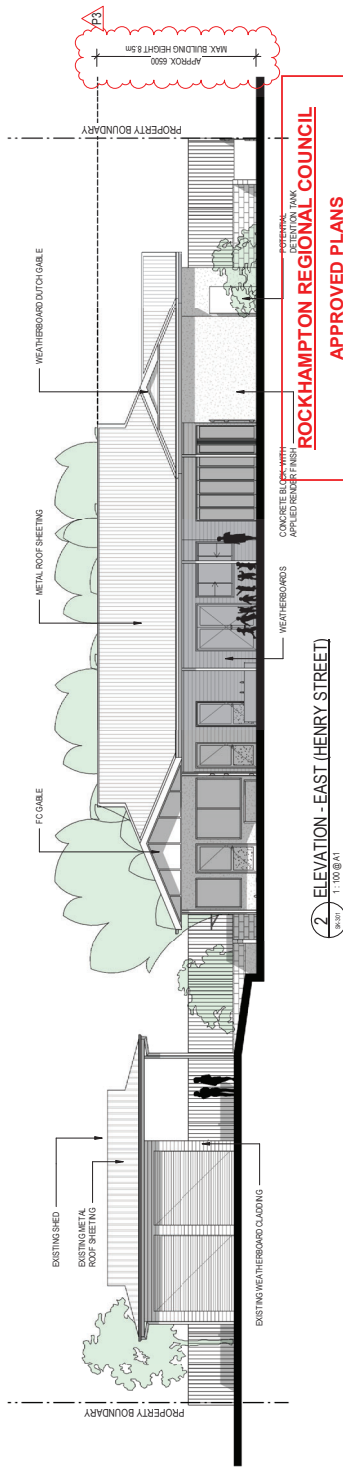
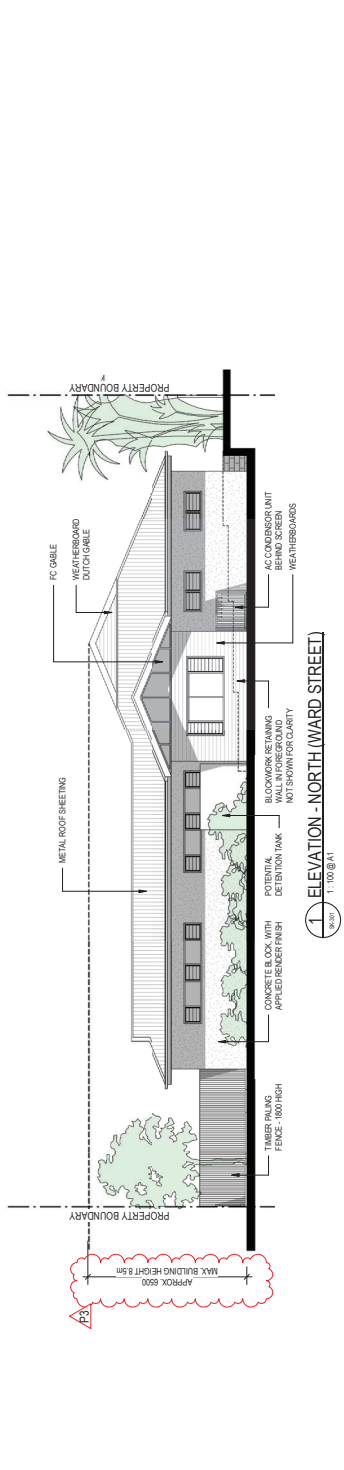
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scale @A3
1 : 200
0 5m 1:200

| REV. | DESCRIPTION | DATE |
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| 1 | ISSUED | 10/03/2021 |
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| 3 | REVISED | 10/03/2021 |
| 4 | REVISED | 10/03/2021 |

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| | |
|------------------------------|--|
| CLIENT | ROMAN CATHOLIC TRUST CORP. DIOCESE OF ROCKHAMPTON FOR CATHOLIC EDUCATION - DIOCESE OF ROCKHAMPTON |
| LOCATION | CORNER OF WARD & HENRY STREET, ROCKHAMPTON QLD. 4700 |
| PROJECT | PROPOSED ST. PETER'S CATHOLIC KINDERGARTEN |
| PROPOSED BUILDING ELEVATIONS | |
| DRAWING NO. | SK-402 |
| REV. | P3 |
| 2137 | |



ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with Development Permit No.: D/129-2021
Dated: 18 January 2022

Letter – 21162LETTM01 [Rev A]
Rockhampton Regional Council
PO Box 1860
Rockhampton, QLD 4700

Attention: Development Assessment
DevelopmentAdvice@rrc.qld.gov.au

Dear RRC Development Assessment Team

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/129-2021

Dated: 18 January 2022

**St Peter's Catholic Kindergarten
Corner Ward and Henry Street, Rockhampton
Traffic and Stormwater Technical Letter – Revision A**

Janes and Stewart Structures Pty Ltd has prepared this technical letter in support of the Material Change of Use Application for the proposed St Peter's Catholic Kindergarten on the corner of Ward Street and Henry Street, Rockhampton.

The kindergarten is proposed on Lot 2 on RP604966 (19 Ward Street) and Lot 3 on RP603066 (52 Henry Street), opposite the existing St Peter's Catholic Primary School, Rockhampton. The following aerial image shows the locality of the development site:



Figure 1 Locality Image

An information request dated 11 October 2021 was received from Rockhampton Regional Council in relation to the previously submitted Material Change of Use (MCU) application for the project, with the application reference D/129-2021. The information request from Council stated more information was required to assess the application.

This report intends to address the items in the information request regarding the Civil engineering matters of traffic and the stormwater drainage strategy.

1. Traffic Investigation

An assessment has been undertaken of the existing road network in the vicinity of the development site and projected development traffic calculated in order to determine any potential impacts on the surrounding road network.

The development site has frontage to Henry Street and Ward Street, with the development access and egress proposed to be via two vehicle crossovers from Henry Street, which service two separate off-street car parking facilities.

The site is located in a short section of Henry Street which intersects Ward Street to the north and Spencer Street to the south as shown in Figure 1 above. This assessment will review traffic on Ward Street, Henry Street and Spencer Street.

The characteristics of the existing external road corridors fronting the development site and the existing school are outlined in the following table:

Table 1 External Road Characteristics

| | Ward Street | Spencer Street | Henry Street |
|---|--|--|--|
| Jurisdiction | Council Controlled | Council Controlled | Council Controlled |
| Road Hierarchy ^[1] | Minor Urban Collector | Minor Urban Collector | Urban Access Street |
| Posted Speed | 50km/h | 50km/h | Not posted (50km/h) |
| School Zone | Yes (40km/h) 7:30am – 9am 2:30pm – 4pm | Yes (40km/h) 7:30am – 9am 2:30pm – 4pm | Yes (40km/h) 7:30am – 9am 2:30pm – 4pm |
| Design AADT (vpd) ^[2] | 751-3000 | 751-3000 | 251-750 |
| Lane Formation | Undivided / two-lane / two-way | Undivided / two-lane / two-way | Undivided / two-lane / two-way |
| Carriageway Width | ~9.7m | ~10.8m | ~12.0m |
| Reserve Width | 20.0m | 20.0m | 20.0m |
| On-Street Parking | Yes (Bus Zone on School side) | Yes (Controlled one side) | Yes (Controlled both sides. Set-down facility School side) |
| Footpaths | Yes (Concrete one side) | Yes (Concrete one side) | Yes (Concrete one side) |
| Cycle Lanes | No | No | No |

^[1] Based off Rockhampton Regional Council Planning Scheme Road Hierarchy Overlay

^[2] Obtained from the Capricorn Municipal Development Guidelines (CMDG) – Design Specification D1 – Geometric Road Design

Traffic Volumes

Traffic Volume data has been made available through Rockhampton Regional Council's traffic count records for Ward Street and Spencer Street. The most recent traffic count information collected by Council was in 2017 between Upper Dawson Road and Henry Street on both Ward Street and Spencer Street. Therefore, this count data will be projected to the current year 2021 by applying a growth rate. Given Ward Street and Spencer Street service a largely developed urbanised catchment, a small growth rate of 1% by annum has been applied to the data.

The morning (AM) and afternoon (PM) peak hours on both Ward Street and Henry Street were provided in the Council traffic count information to be as follows:

AM Peak: 8:00am to 9:00am

PM Peak: 3:00pm to 4:00pm

No traffic count data was available from Council for this particular section of Henry Street, however it is expected that due to the nature of the traffic catchment that Henry Street will have the same peak hours as Ward Street and Spencer Street.

Henry Street currently services six (6) residential allotments and St Peter's Catholic Primary School, with a set-down, pick-up facility located on Henry Street for the school purposes. As the applicant for this project is also the custodian for the school, the school has undertaken recent traffic count information over a 5 day period for utilisation of the Henry Street set-down, pick-up facility. The study confirmed that an average of 76 cars use the set-down pick-up in a 20 minute afternoon (PM) peak.

Therefore, the following parameters were adopted to determine the estimated Average Annual Daily Traffic (AADT) and Peak Hourly Volumes of Henry Street:

- The Henry Street set-down pick-up 20 minute (PM) traffic count equates to 40% of the AADT generated by the school on Henry Street.
- Daily trips per residential dwelling allotment = 10 trips per day.
- The Henry Street AM peak is assumed to be 30% of the AADT.
- The Henry Street PM peak is assumed to be 40% of the AADT.

The adopted percentages of AADT to determine the peak hourly volumes on Henry Street have been based on the traffic count information supplied for the existing school set-down pick-up and considering the majority of traffic using Henry Street will be from the school use.

The following tables provides a summary of the traffic count data and the project traffic volume in 2021 to form the base case for the analysis for the Average Annual Daily Traffic (AADT) and Peak Hourly Volumes respectively:

Table 2 Average Annual Daily Traffic (AADT)

| Year | Ward Street ^[2] (vpd) | Spencer Street ^[2] (vpd) | Henry Street (vpd) |
|--|----------------------------------|-------------------------------------|--------------------|
| 2017 | 1049.5 | 1874.7 | N/A |
| 2021 ^[1] (Base Case) | 1093 | 1951 | 250 |

^[1] Based on a 1% growth rate of 2017 AADT data.

^[2] AADT Count taken between Upper Dawson Road and Henry Street.

Table 3 Peak Hourly Volumes

| Year | Ward Street ^[2] (vph) | | Spencer Street ^[2] (vph) | | Henry Street (vph) | |
|--|----------------------------------|-----|-------------------------------------|-----|--------------------|-----|
| | AM | PM | AM | PM | AM | PM |
| 2017 | 98 | 101 | 215 | 193 | N/A | N/A |
| 2021 ^[1] (Base Case) | 102 | 105 | 224 | 201 | 75 | 100 |

^[1] Based on a 1% growth rate of 2017 AADT data.

^[2] Peak Hourly Count taken between Upper Dawson Road and Henry Street.

Traffic Generation

The projected traffic generation from the proposed kindergarten development has been determined using typical traffic generation rates from similar developments such as child care facilities. The Department of Transport and Main Roads Guide to Traffic Impact Assessment – December 2018 suggests that Traffic Generation Data is available through the Queensland Government Open Source Data. An analysis of the average weekday (daily) volumes from the open source data has been completed to calculate an average traffic generation rate for this childcare facility and considering the following specific to the development:

- The development is located in walking distance to nearby residences, so traffic generated would be less than other typical stand-alone childcare centres considering walking traffic to the kindergarten.
- Kindergartens operate differently to a typical childcare centre where the ages of the students are closer together (i.e. one year level).
- The kindergarten is associated with the nearby St Peter's Catholic Primary School, where it is expected 60% of traffic generated for the kindergarten will already be catered for by the school use (i.e. traffic will already be generated by siblings of students attending the school).

The development is planned to accommodate a total of 30 children/students and have 3 full time employees. Traffic generation from the development is based on the total number of children.

The traffic no longer generated from the two existing residential allotments where the development is situated has also been considered in determining the additional traffic from the development:

Therefore, the existing residential traffic no longer generated will be subtracted from the additional kindergarten traffic.

The following table includes the calculated traffic generation rate per child as well as projected traffic generation from development:

Table 4 Traffic Generation

| Description | Value |
|---|-----------|
| Adopted Childcare Generation Rate (daily trips per children) ^[1] | 2.5 |
| Number of Students ^[2] | 30 |
| Percentage of Traffic Generation catered for in co-use with school | 60% |
| Daily Traffic Generation (vehicles per day) | 30 |
| Daily Traffic Reduction from Existing Removed Residential Allotments (vehicles per day) | 20 |
| Additional Daily Traffic Generation (vehicles per day) | 10 |

^[1] derived from Queensland Open Source Data for a Childcare Use.

^[2] based on planned yield for the kindergarten (Refer Development Application).

Therefore, it is expected that the development will generate an additional 10 vehicles per day to the surrounding road network.

Given the nature of the kindergarten it is likely that the majority of movements will occur in the peak hourly periods. Therefore of this additional traffic, 30% of daily traffic will be within the AM Peak and 40% will be within the PM Peak, with the kindergarten peak occurring at the same time as the existing peak hours on the surrounding road corridors.

Traffic Impact Review

A review of the projected traffic volumes of the external road corridors of Ward Street, Spencer Street and Henry Street with the inclusion of the additional traffic generated from the kindergarten development has been conducted.

The following parameters were made in relation to the split of traffic towards Ward Street and Spencer Street utilising the development:

- 60% of the additional traffic from the kindergarten will utilise Ward Street
- 40% of the additional traffic from the kindergarten will utilise Spencer Street.
- All additional traffic will utilise Henry Street.

Based on the above parameters and considerations, the following tables show the results for both AADT and Peak Hourly Volume:

Table 5 AADT Traffic Volumes - Base Case and Total Developed Case

| Description | Average Annual Daily Traffic (AADT) – vehicles per day (vpd) | | |
|---------------------------------------|--|----------------|--------------|
| | Ward Street | Spencer Street | Henry Street |
| 2021 (Base Case) | 1093 | 1951 | 250 |
| Additional Development Traffic | 6 | 4 | 10 |
| Total | 1099 | 1955 | 260 |
| % Increase | 0.55 | 0.2 | 4.0 |

Table 6 Peak Hourly Traffic Volumes - Base Case and Total Developed Case

| Description | Peak Hourly Volumes – vehicles per hour (vph) | | | | | |
|---------------------------------------|---|------------|----------------|------------|--------------|------------|
| | Ward Street | | Spencer Street | | Henry Street | |
| | AM | PM | AM | PM | AM | PM |
| 2021 (Base Case) | 102 | 105 | 224 | 201 | 75 | 100 |
| Additional Development Traffic | 2 | 3 | 2 | 2 | 3 | 4 |
| Total | 104 | 108 | 226 | 203 | 78 | 104 |
| % Increase | 2.0 | 2.9 | 1.0 | 1.0 | 4.0 | 4.0 |

As shown above, the additional traffic generated by the kindergarten development does not significantly increase the traffic volumes for daily traffic and peak hourly volumes on the external road corridors adjacent. The percentage increase is less than the 5% increase threshold suggested in the Department of Transport and Main Roads (TMR) guide to traffic impact assessment. Therefore, it is suggested no further traffic impact assessment is required for this kindergarten development.

2. Stormwater Quantity

An analysis has been undertaken for the stormwater management strategy for the kindergarten development to ensure that no adverse impacts occur to adjacent and downstream properties and infrastructure as a result of the works.

Existing System

The site planned for development encompasses two existing residential allotments. One of these allotments at 52 Henry Street has an existing dwelling located on the site which will be demolished to make way for development. The other residential dwelling at 19 Ward Street has been previously demolished in recent years in preparation with an existing shed remaining on the site. For the purposes of the stormwater assessment, both residential properties are considered to have dwelling houses in place on the site.

Both residential allotments fall towards the intersection of Henry Street and Ward Street at an average grade of approximately 4% based on existing lidar contour information available. The kerb and channel of Henry Street is used to capture and convey this runoff further downstream before entering an existing stormwater inlet and pipe system at the intersection of Ward Street and Upper Dawson Road.

The following points highlight the key stormwater characteristics of the site:

- The site falls to the road reserves of Henry Street and Ward Street as the legal point of discharge.
- An external upstream catchment discharges to the site from the west up to the Mater Hospital property boundary. The external catchment is conveyed via surface overland sheet flow across the site.
- The site is part of a greater external catchment that extends 540m uphill to the west of the site including the Mater Hospital, Bethany Aged Care and surrounding residential allotments.
- Existing Council stormwater infrastructure exists in the road reserves surrounding these catchments to capture and convey stormwater through existing underground pit and pipe networks.

Based on the location of the existing underground stormwater infrastructure and the nature of the topography, the external catchment can be divided into sub-catchments for the purposes of stormwater analysis. The intersection of Ward Street and Henry Street immediately downstream of the site was used as the point of analysis (the outlet of Catchment 2). The existing catchment plan is attached to this technical letter and details the location and extent of the catchments analysed.

The following tables shows key characteristics of each catchment considered in the analysis. The coefficient of discharge (C_{10}) value for each catchment has been assigned based on the fraction impervious for each catchment and the recommendations within Table 4.5.3 of the Queensland Urban Drainage Manual (QUDM) 2017.

Table 7 Existing Catchment Details

| Catchment ID | Area (ha) | Percentage Impervious (fi) - % | Coefficient of Discharge (C_{10}) | Discharge Location |
|--------------|---------------|--------------------------------|---------------------------------------|--------------------------|
| 1 | 0.203 | 28.0 | 0.73 | Ward Street RGU |
| 2 | 2.038 | 20.0 | 0.71 | Cnr Henry St and Ward St |
| 4 | 2.302 | 50.0 | 0.78 | Spencer Street RGU |
| 5 | 0.691 | 90.0 | 0.88 | Spencer Street RGU |
| 6 | 0.240 | 80.0 | 0.85 | Agnes Street RGU |
| 7 | 0.270 | 68.0 | 0.82 | Ward Street RGU |
| 8 | 1.997 | 90.0 | 0.88 | Ward Street RGU |
| 9 | 0.271 | 68.0 | 0.82 | Jessie Street RGU |
| 10 | 0.050 | 68.0 | 0.82 | Ward Street RGU |
| 11 | 0.117 | 68.0 | 0.82 | Ward Street RGU |
| BETH-1 | 0.628 | 50.0 | 0.78 | Agnes Street RGU |
| BETH-2 | 2.045 | 68.0 | 0.82 | Ward Street RGU |
| Total | 10.852 | | | |

RGU – Road Gully Unit

The existing underground stormwater infrastructure via the road gully units (RGU) captures and diverts portions of the total catchment runoff away from the point of analysis at the Henry Street and Ward Street intersection (outlet of Catchment 2). Therefore, the capacity of each road gully unit and road cross section within the system was determined using PCDrain stormwater modelling software to calculate the volume of runoff bypassing prior to the Henry Street and Ward Street intersection. This includes the total road capacity of the streets within the system, with peak water levels above the road surface crown overtopping the system where applicable. The locations of notable runoff overtopping the road surface crown are noted on the existing catchment plan attached and considered in the analysis.

The adopted design rainfall intensities were sourced from the Bureau of Meteorology Design Rainfall Data (2016) for the site location in Rockhampton, Queensland. Using this rainfall data, the minor system has been modelled in PC Drain for an 18% Average Exceedance Probability (AEP), 1 in 5 Average Recurrence Interval (ARI). The major system has been modelled for a 1% AEP (1 in 100 year ARI).

The peak flows at the critical points within the system analysed have been determined based on the PC Drain modelling and are shown in the following table. These peak flows are the surface flows at the Road Gully Units taking into account gutter flows and flows overtopping the road surface crown. It is possible the minor peak flows on the southern side of Ward Street could be similar to the major flows based on flows overtopping road surface crowns in major and minor storm events. The peak flows at the point of analysis being the intersection of Henry Street and Ward Street are provided under the identification “Receiving”.

The critical time of concentration at the “Receiving” node has been calculated to be 15 minutes based off the modelling and considering a portion of the upstream catchment bypassing prior to reaching the “Receiving” node through pipe networks diversions and overtopping road surface crowns.

The peak runoffs from each catchment are also provided in the following table.

Table 8 Existing Peak Surface Flows

| ID | Catchment ID | Peak Catchment Flow (m³/s) | | Peak Surface Flow at ID (m³/s) | |
|-----------|--------------|----------------------------|--------------------------|--------------------------------|--------------------------|
| | | 18% AEP (1 in 5 ARI) | 1% AEP (1 in 100 ARI) | 18% AEP (1 in 5 ARI) | 1% AEP (1 in 100 ARI) |
| 1/1 | 6 | 0.093 | 0.201 | 0.093 | 0.201 |
| 1/2 | 9 | 0.100 | 0.223 | 0.100 | 0.223 |
| 1/3 | 8 | 0.797 | 1.670 | 0.797 | 1.256 |
| 1/4 | 4 | 0.577 | 1.215 | 0.577 | 1.215 |
| 1/5 | 1 | 0.067 | 0.149 | 0.973 | 0.973 |
| 2/2 | 7 | 0.100 | 0.222 | 0.100 | 0.222 |
| 2/4 | 5 | 0.276 | 0.578 | 0.276 | 0.578 |
| 3/1 | 10 | 0.019 | 0.041 | 0.019 | 0.041 |
| 4/1 | 11 | 0.043 | 0.096 | 0.051 | 0.116 |
| Receiving | 2 | 0.463 | 1.056 | 1.256 | 1.317 |

Proposed System

The kindergarten development is located within catchment 2 modelled as part of the existing system analysis. The development proposal includes a new kindergarten building and associated outdoor learning spaces as well as off-street car parking facilities. The existing shed is intended to be retained as part of the kindergarten. Refer to the attached development site plan prepared by Tony Madden Architects for more details of the proposed layout.

The existing site discharge location will be maintained as per the existing system. The kindergarten precinct will increase the fraction impervious on the site compared to the existing residential scenario. The additional impervious results in an increase to the catchment 2 fraction impervious by approximately 5%.

Therefore, this increase in impervious area for catchment 2 was modelled with all other existing catchments remaining the same in order to compare the existing system with the proposed system.

The details of the catchments modelled in the proposed system scenario are shown in the following table, with the C_{10} value for catchment 2 updated to include the proposed kindergarten layout:

Table 9 Proposed Catchment Details

| Catchment ID | Area (ha) | Percentage Impervious (fi) - % | Coefficient of Discharge (C_{10}) | Discharge Location |
|--------------|---------------|--------------------------------|---------------------------------------|--------------------------|
| 1 | 0.203 | 28.0 | 0.73 | Ward Street RGU |
| 2 | 2.038 | 25.0 | 0.72 | Cnr Henry St and Ward St |
| 4 | 2.302 | 50.0 | 0.78 | Spencer Street RGU |
| 5 | 0.691 | 90.0 | 0.88 | Spencer Street RGU |
| 6 | 0.240 | 80.0 | 0.85 | Agnes Street RGU |
| 7 | 0.270 | 68.0 | 0.82 | Ward Street RGU |
| 8 | 1.997 | 90.0 | 0.88 | Ward Street RGU |
| 9 | 0.271 | 68.0 | 0.82 | Jessie Street RGU |
| 10 | 0.050 | 68.0 | 0.82 | Ward Street RGU |
| 11 | 0.117 | 68.0 | 0.82 | Ward Street RGU |
| BETH-1 | 0.628 | 50.0 | 0.78 | Agnes Street RGU |
| BETH-2 | 2.045 | 68.0 | 0.82 | Ward Street RGU |
| Total | 10.852 | | | |

The PC Drains model was calibrated to determine the peak flow rates at the critical road gully unit locations and the receiving point of analysis for the proposed system scenario. It was noted in the modelling that the critical time of concentration at the "Receiving" point of analysis remained the same as the existing scenario. The peak catchment flows were also calculated. The same design storms were analysed as follows:

Table 10 Proposed Peak Surface Flows

| ID | Catchment ID | Peak Catchment Flow (m³/s) | | Peak Surface Flow at ID (m³/s) | |
|-----------|--------------|----------------------------|--------------------------|--------------------------------|--------------------------|
| | | 18% AEP (1 in 5 ARI) | 1% AEP (1 in 100 ARI) | 18% AEP (1 in 5 ARI) | 1% AEP (1 in 100 ARI) |
| 1/1 | 6 | 0.093 | 0.201 | 0.093 | 0.201 |
| 1/2 | 9 | 0.100 | 0.223 | 0.100 | 0.223 |
| 1/3 | 8 | 0.797 | 1.670 | 0.797 | 1.256 |
| 1/4 | 4 | 0.577 | 1.215 | 0.577 | 1.215 |
| 1/5 | 1 | 0.067 | 0.149 | 0.973 | 0.973 |
| 2/2 | 7 | 0.100 | 0.222 | 0.100 | 0.222 |
| 2/4 | 5 | 0.276 | 0.578 | 0.276 | 0.578 |
| 3/1 | 10 | 0.019 | 0.041 | 0.019 | 0.041 |
| 4/1 | 11 | 0.043 | 0.096 | 0.051 | 0.116 |
| Receiving | 2 | 0.470 | 1.071 | 1.256 | 1.325 |

Summary of Existing and Proposed Peak Flow Rates

The peak flow rates determined for the existing system and proposed system at the "Receiving" identification being the intersection of Ward Street and Henry Street have been summarised in the following table to form a comparison.

Table 11 Existing and Proposed Peak Surface Flow Rates "Receiving"

| ID | Existing Peak Surface Flow (m³/s) | | Proposed Peak Surface Flow at ID (m³/s) | | Difference (m³/s) | |
|-----------|-----------------------------------|--------------------------|---|--------------------------|-------------------------|--------------------------|
| | 18% AEP (1 in 5 ARI) | 1% AEP (1 in 100 ARI) | 18% AEP (1 in 5 ARI) | 1% AEP (1 in 100 ARI) | 18% AEP (1 in 5 ARI) | 1% AEP (1 in 100 ARI) |
| Receiving | 1.256 | 1.317 | 1.256 | 1.325 | 0.00 | 0.008 |

The peak flows discharging from catchment 2 in both the existing and proposed system is provided in the following table:

Table 12 Existing and Proposed Peak Surface Flow Rates - Catchment 2

| ID | Existing Peak Surface Flow (m³/s) | | Proposed Peak Surface Flow at ID (m³/s) | | Difference (m³/s) | |
|-----------|-----------------------------------|--------------------------|---|--------------------------|-------------------------|--------------------------|
| | 18% AEP (1 in 5 ARI) | 1% AEP (1 in 100 ARI) | 18% AEP (1 in 5 ARI) | 1% AEP (1 in 100 ARI) | 18% AEP (1 in 5 ARI) | 1% AEP (1 in 100 ARI) |
| Receiving | 0.463 | 1.056 | 0.470 | 1.071 | 0.007 | 0.015 |

As can be seen in the tables above, the kindergarten development makes a negligible impact on the stormwater situation around the site with a $0.015\text{m}^3/\text{s}$ increase in a 1% AEP discharging from catchment 2 in the proposed system compared to the existing system. The development is located in the lower portion of the analysed catchment and the increased impervious area shortens the critical time of concentration for catchment 2 further separating critical times from the upper portions of the catchment to the “Receiving” point of analysis.

Therefore based on this analysis, no stormwater quantity mitigation measures such as detention will be required to accommodate the development works as the peak flows from the site do not coincide with the peak flows from the total contributing catchment.

3. Stormwater Management Plan

The drainage strategy for the kindergarten development will maintain the same discharge locations as the existing scenario. There is no underground stormwater infrastructure in close proximity within the council road corridors adjacent to the site. Therefore, it is proposed that any piped drainage from the site will discharge via kerb adaptors. Given this limitation, it is intended that pipe drainage will be separated for the car park areas and building roofwater to split flows rather than to concentrate flows in one location. A preliminary piped stormwater layout is shown on the concept stormwater management plan attached to this letter. This may be subject to change and further details of the proposed pit and pipe drainage will be confirmed at the detailed design phase of the project.

The site has an existing upstream external catchment from residential properties to the west, which is a portion of existing catchment 2. These catchments are shown in the following image:



Figure 2 External Site Catchments (Roof, Carpark 1 and Carpark 2 catchments are based on the proposed layout not shown)

The 1% AEP approach flows for the site specific external catchments shown in the above figure are provided in the following table. These flows have been calculated using the rational method in accordance with the Queensland Urban Drainage Manual 2017 (QUDM), with adopted time of concentration provided.

Table 13 External Site Catchment Characteristics

| Catchment | Adopted Time of Concentration - t_c (mins) | Fraction Impervious (fi) - % | 1% AEP Approach Flow (m ³ /s) |
|---------------|--|------------------------------|--|
| Catch Drain 1 | 11 | 20.0 | 0.272 |
| Catch Drain 2 | 11 | 20.0 | 0.131 |

To adequately convey the runoff from the external catchments outlined above, the use of drainage catch drains will be incorporated into the development layout to outlet at the legal point of discharge of Henry Street and Ward Street. Details of the preliminary catch drain characteristics are provided below:

Table 14 Preliminary Channel Characteristics

| Description | Catch Drain 1 Channel | Catch Drain 2 Channel |
|---|--|--|
| Profile | Trapezoidal Flat bottom channel, 1 st side 1 in 4 batter, 2 nd side vertical wall | Trapezoidal Flat bottom channel, 1 st side 1 in 4 batter, 2 nd side vertical wall |
| Average Overall Depth | 0.25m | 0.25m |
| Base Width | 1.00m | 1.00m |
| Manning's Roughness 'n' | 0.035 | 0.035 |
| Average Slope | 1.0% | 3.0% |
| Water Depth (based on 1% AEP Approach Flow) | 0.23m | 0.112m |
| Channel Capacity | 0.322 m ³ /s | 0.133 m ³ /s |

The concept stormwater management plan attached to this letter shows the location of the preliminary catch drains to convey the runoff from the external catchments forming part of the overall drainage strategy for the project.

4. Stormwater Quality

The stormwater quality assessment for the development has been based on the requirements listed in the State Planning Policy – July 2017 (SPP) under the Water Quality section.

The combined site area of the two allotments for development is 2,454m² and therefore below the threshold trigger for Stormwater Quality assessment of 2,500m² stated within the SPP. As a result, we believe that no stormwater quality measures or improvement devices are required to be implemented as part of this development.

If you have any queries in relation to this technical letter, please do not hesitate to contact our office and speak with Matthew Dennis.

Yours sincerely



Matthew Dennis

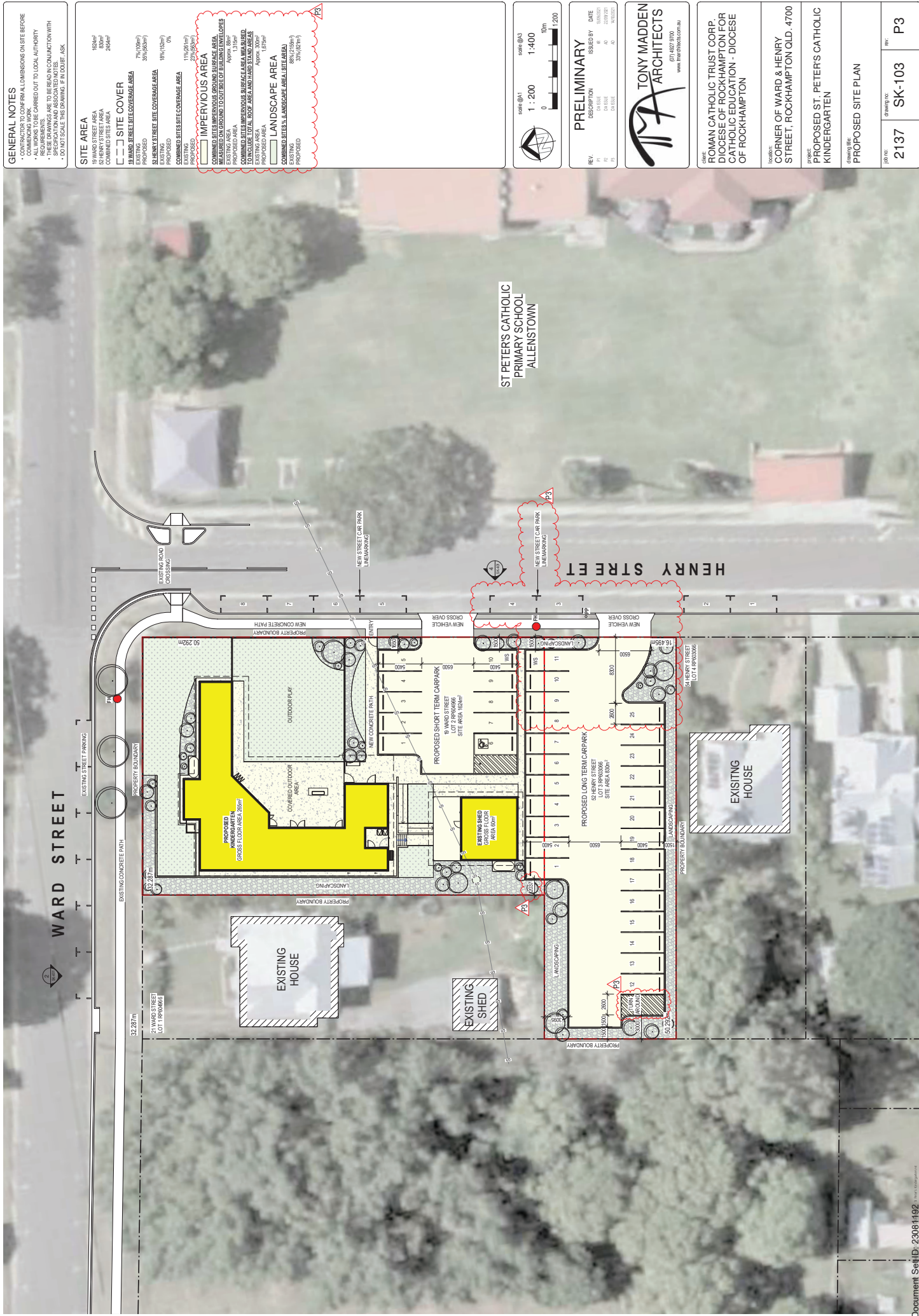
RPEQ 24862

Senior Civil Engineer

for and on behalf of Janes and Stewart Structures Pty Ltd

Attachments

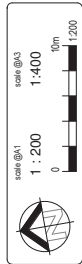
1. Architectural Site Plan SK-103 by Tony Madden Architects
2. SK01 Existing Stormwater Catchment Plan by Janes and Stewart Structures
3. Concept Stormwater Management Plan (mark up by Janes and Stewart Structures, plan by Tony Madden Architects)



GENERAL NOTES

- * CONTRACTOR TO CONFIRM ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK.
- * ALL DIMENSIONS ARE TO BE CARRIED OUT TO LOCAL AUTHORITY REQUIREMENTS.
- * THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE PROJECT DESCRIPTION AND SPECIFICATIONS.
- * DO NOT SCALE THIS DRAWING. IF IN DOUBT, ASK.

| | |
|---|--------------|
| SITE AREA | |
| 19 WARD STREET AREA | 1624sqm |
| 50 HENRY STREET AREA | 830sqm |
| COMBINED SITES AREA | 2454sqm |
| 19 WARD STREET SITE COVER | |
| PROPOSED | 31% (506sqm) |
| EXISTING | 30% (492sqm) |
| 50 HENRY STREET SITE COVER | |
| PROPOSED | 18% (150sqm) |
| EXISTING | 0% |
| COMBINED SITES SITE COVER | |
| PROPOSED | 24% (598sqm) |
| EXISTING | 11% (267sqm) |
| IMPERVIOUS AREA | |
| MEASURED ON GROUND TO OUTLINE OF BUILDING ENVELOPES | |
| COMBINED SITES IMPERVIOUS SURFACE AREA | 1335sqm |
| PROPOSED AREA | 1335sqm |
| EXISTING AREA | 1335sqm |
| LANDSCAPE AREA | |
| COMBINED SITES LANDSCAPE AREA | 1120sqm |
| PROPOSED AREA | 1120sqm |
| EXISTING AREA | 1120sqm |



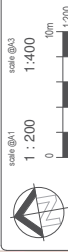
| | |
|--------------------|------------|
| PRELIMINARY | |
| REV. | DATE |
| P1 | 10/03/2021 |
| P2 | 10/03/2021 |
| P3 | 10/03/2021 |



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| CLIENT | |
| ROMAN CATHOLIC TRUST CORP. DIOCESE OF ROCKHAMPTON FOR CATHOLIC EDUCATION - DIOCESE OF ROCKHAMPTON | |
| LOCATION | |
| CORNER OF WARD & HENRY STREET, ROCKHAMPTON QLD, 4700 | |
| PROJECT | |
| PROPOSED ST. PETER'S CATHOLIC KINDERGARTEN | |
| DRAWING NO. | |
| PROPOSED SITE PLAN | |
| PROJ. NO. | REV. |
| 2137 | SK-103 |
| | P3 |

- CONTRACTOR TO CONFIRM ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK.
- ALL WORKS TO BE CARRIED OUT TO LOCAL AUTHORITY REQUIREMENTS.
- THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH SPECIFICATION AND ASSOCIATED NOTES.
- DO NOT SCALE THIS DRAWING. IF IN DOUBT, ASK.

| | | |
|--|--|------------------|
| <input type="checkbox"/> SITE AREA | 152' x 64' | 9,728 sq. ft. |
| <input type="checkbox"/> WARD STREET AREA | 83' x 64' | 5,312 sq. ft. |
| <input type="checkbox"/> SE HENRY STREET AREA | 100' x 64' | 6,400 sq. ft. |
| <input type="checkbox"/> COMBINED SITES AREA | 256' x 64' | 16,448 sq. ft. |
| <input type="checkbox"/> SITE COVER | 7% (100' x 64') | 6,400 sq. ft. |
| <input type="checkbox"/> SITE COVER AREA | 30% (100' x 64') | 19,200 sq. ft. |
| <input type="checkbox"/> WARD STREET SITE COVER AREA | 18% (83' x 64') | 10,752 sq. ft. |
| <input type="checkbox"/> SE HENRY STREET SITE COVER AREA | 11% (100' x 64') | 6,400 sq. ft. |
| <input type="checkbox"/> COMBINED SITES COVER AREA | 29% (200' x 64') | 17,600 sq. ft. |
| <input type="checkbox"/> IMPERVIOUS AREA | EXISTING AREA | 15,360 sq. ft. |
| <input type="checkbox"/> IMPERVIOUS AREA | APPROX. 50% OF TOTAL AREA | 8,192 sq. ft. |
| <input type="checkbox"/> IMPERVIOUS AREA | MEASURED ON GROUND TO OUTLINE OF BUILDING FOOTPRINTS | 15,360 sq. ft. |
| <input type="checkbox"/> IMPERVIOUS AREA | COMBINED SITES IMPERVIOUS SURFACE AREA | 15,360 sq. ft. |
| <input type="checkbox"/> IMPERVIOUS AREA | TO INCLUDE TOTAL ROOF AREA AND HARD SURFACE AREAS | 15,360 sq. ft. |
| <input type="checkbox"/> LANDSCAPE AREA | APPROX. 50% OF TOTAL AREA | 8,192 sq. ft. |
| <input type="checkbox"/> LANDSCAPE AREA | COMBINED SITES LANDSCAPE AREA | 8,192 sq. ft. |
| <input type="checkbox"/> LANDSCAPE AREA | EXISTING | 68% (175' x 64') |
| <input type="checkbox"/> LANDSCAPE AREA | PROPOSED | 32% (80' x 64') |



| REV. | DESCRIPTION | ISSUED BY | DATE |
|------|-------------|-----------|------------|
| P1 | CM ISSUE | SE | 13/09/2020 |
| P2 | CM ISSUE | AD | 22/09/2020 |
| P3 | CM ISSUE | AD | 14/10/2020 |



client
ROMAN CATHOLIC TRUST CORP.
DIOCESE OF ROCKHAMPTON FOR
CATHOLIC EDUCATION - DIOCESE
OF ROCKHAMPTON

| | |
|-----------|--|
| location: | CORNER OF WARD & HENRY STREET, ROCKHAMPTON QLD. 4700 |
| project: | PROPOSED ST. PETER'S CATHOLIC KINDERGARTEN |

| | | | |
|---|-------------|---------------|-----------|
| drawing title: PROPOSED SITE PLAN | job no: | drawing no: | rev: |
| | 2137 | SK-103 | P3 |

