Sewer and Water Network Analysis

Client: Glenmore Holdings (Aust) Pty Ltd

Address: C/- Contour Consulting
349 Hobler Avenue
FRENCHVILLE QLD 4701

Site Address: Riverside Waters
Lot 102 on RP860099
Lot 129 on PL4021
Lot 92 on SP224420
Belmont Rd, PARKHURST, 4702

ROCKHAMPTON REGIONAL COUNCIL
AMENDED PLANS APPROVED
24 October 2019
DATE
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/84-2014
Dated: 15 September 2015

Sewer Network Analysis

Description of Analysis:

A sewer network analysis for the proposed site was originally carried out in 2015 as future stages to the Riverside Estate development. Since this time the proposed development has been renamed Riverside Waters and the total number of allotments has increased from 201 to 222.

Preliminary approval has previously been granted for the residential development of lot 102 on RP860099 and Lot 129 on PL4021. The following report has been prepared to meet the further information request for a sewer network analysis to be provided in order to demonstrate that the proposed development will not have any adverse impacts on the existing reticulated sewer network.

It is understood that a further application for the preliminary approval of residential development of Lot 92 on SP224420 is currently being prepared. It has been requested that the additional 127 allotments from this further application be included in the network analysis.

It should be noted that the inclusion of these additional 127 allotments in this network analysis does not imply any approval of the application however if the preliminary approval is granted then the following analysis may be used as supporting information for the proposed sewer strategy.

The following drawings were provided by Contour Consulting

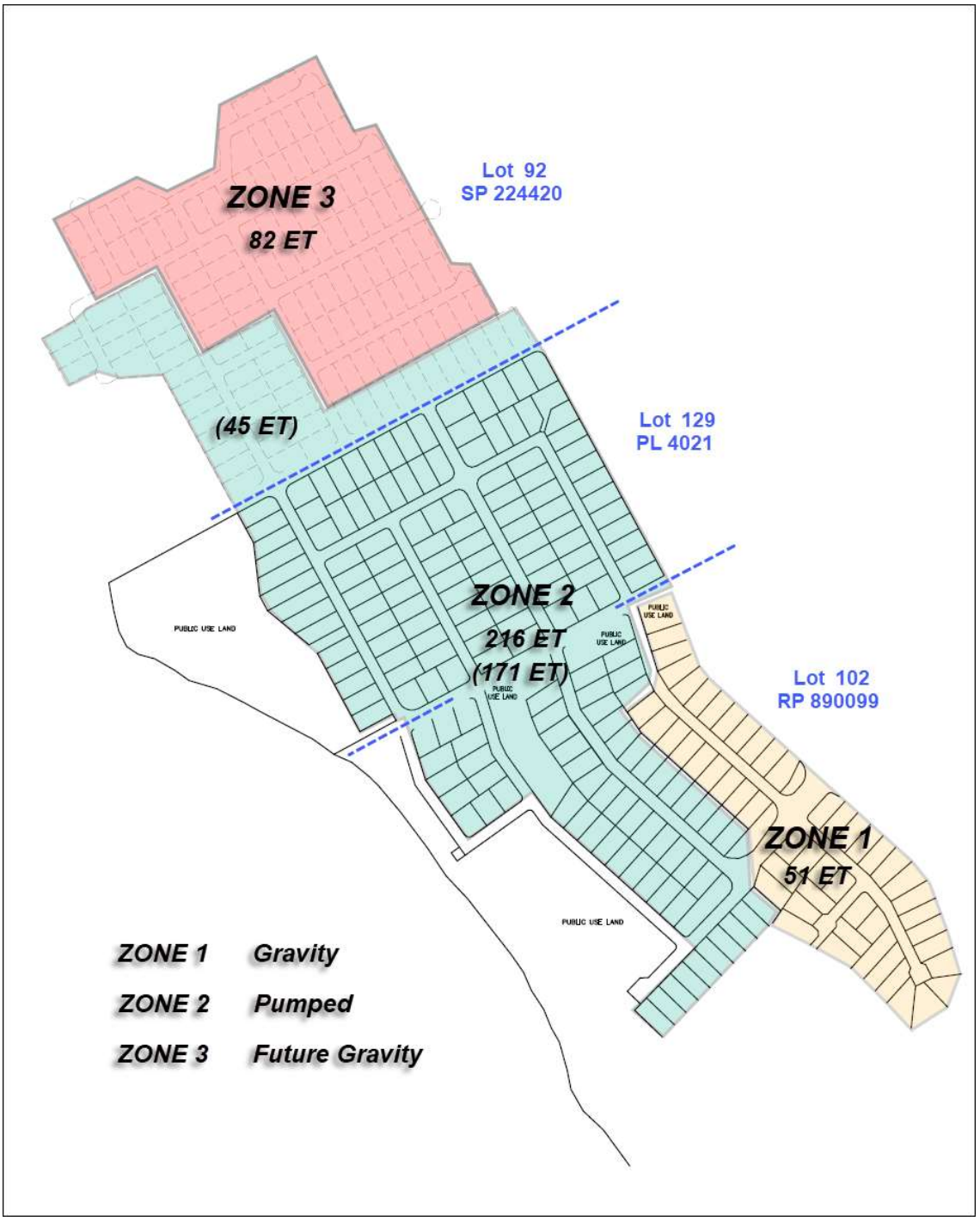
Refer Attachment A

Staging Plan

Allotment layout with finished contours

Network Analysis

From the information provided by Contour Consulting the proposed development has been separated in three catchment zones as shown below.

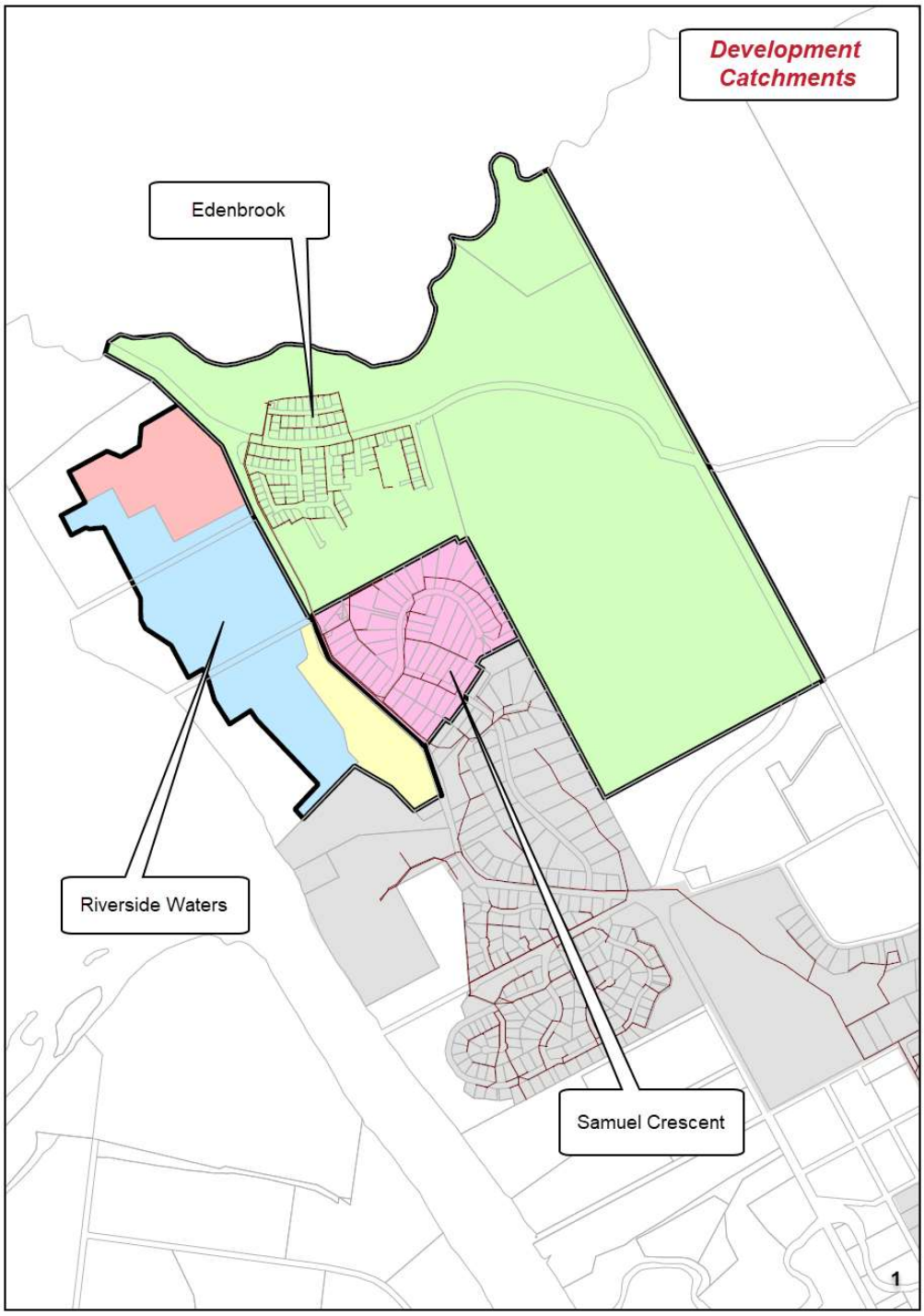


Proposed Catchment Zones

It is noted how Zone 2 extends across both Lot 129 on PL4021 and Lot 92 on SP224420.

Development Catchments

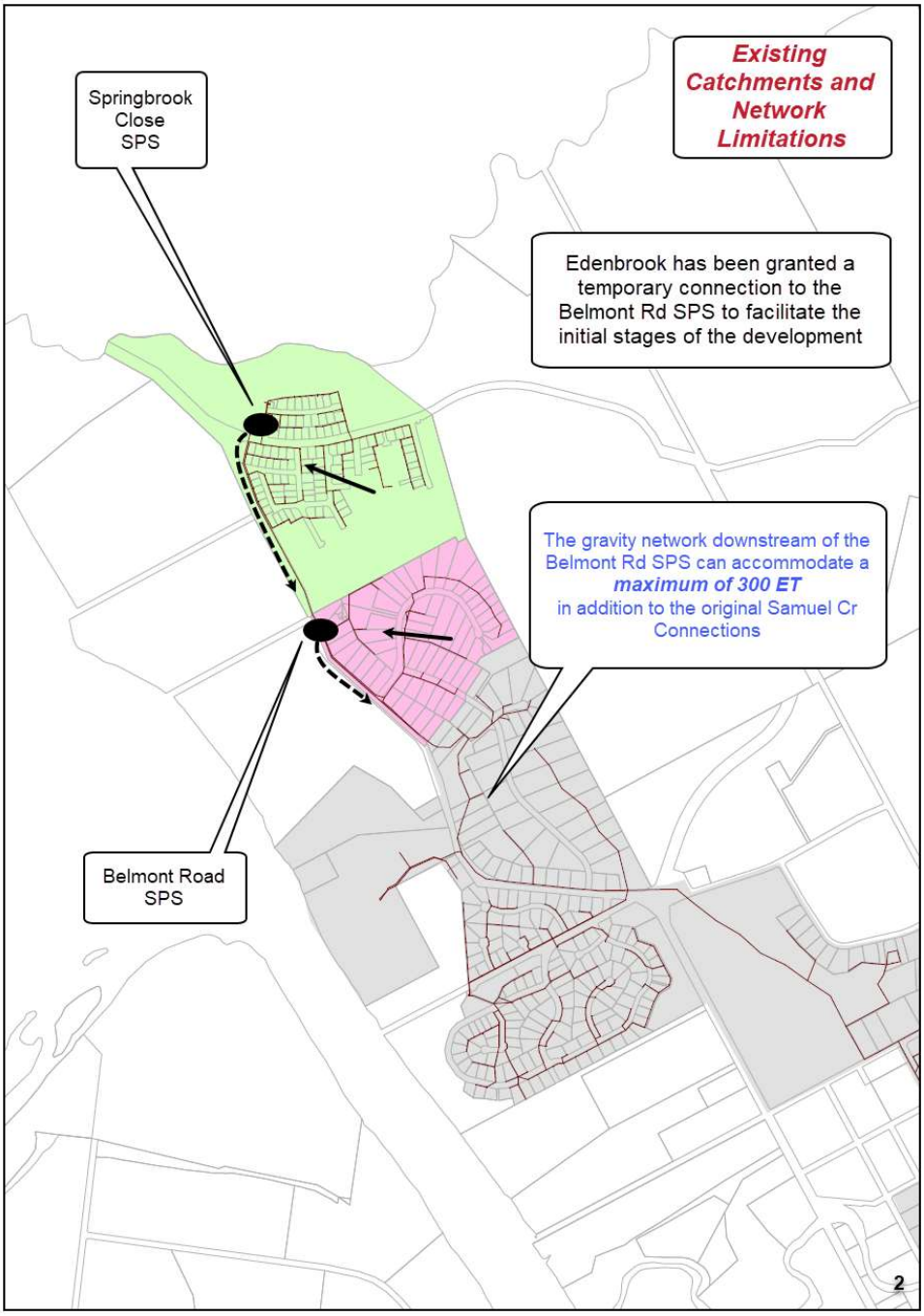
The following sketch shows where the Riverside Waters development lies in respect to the surrounding developments Edenbrook and Samuel Crescent.



Surrounding Developments

Belmont Road Sewage Pump Station

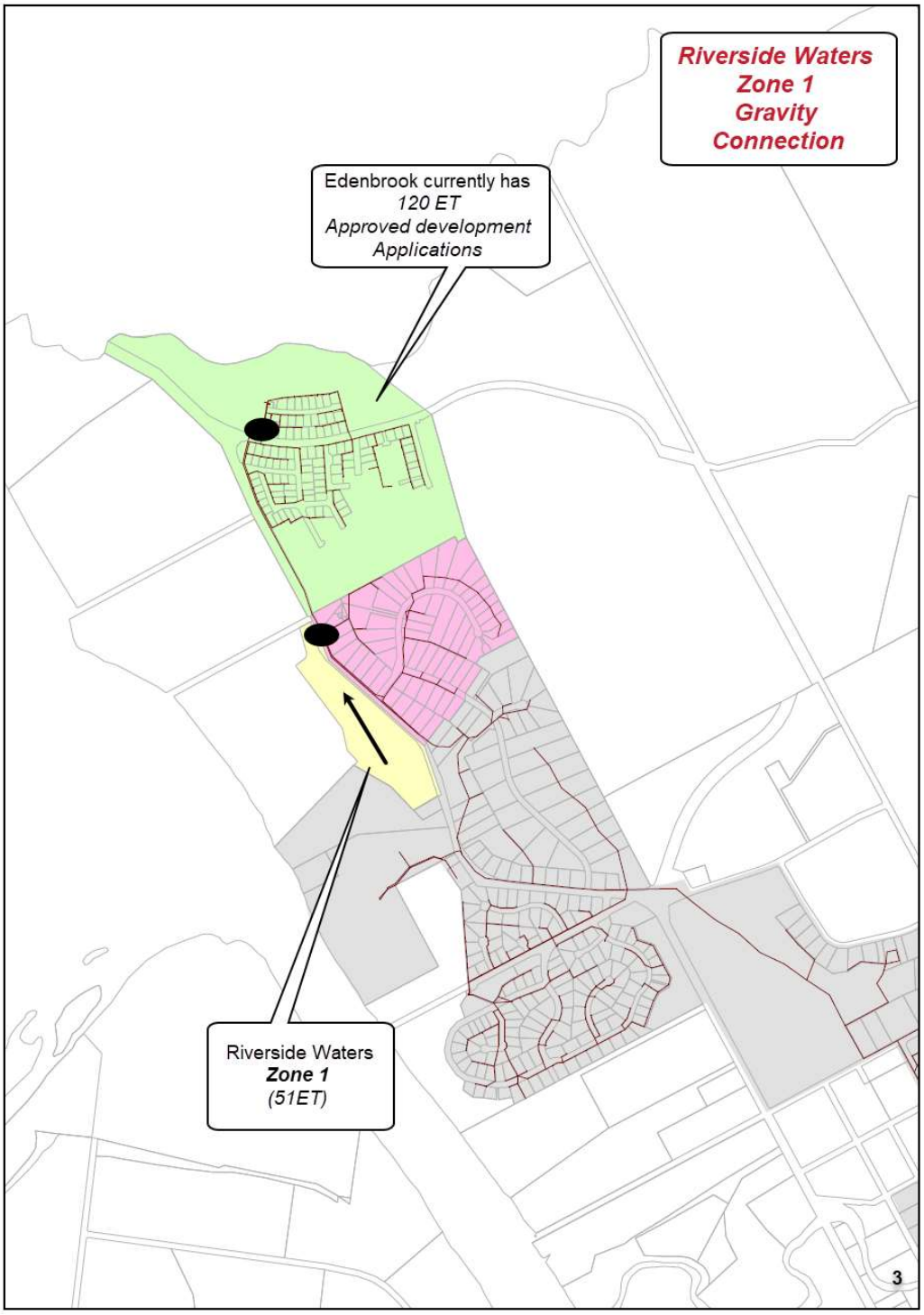
The Belmont Road sewage pump station was constructed in 1984 to service the Samuel Crescent catchment. The following sketch shows how the Edenbrook development was granted a temporary connection in 2014 to facilitate the initial stages of development via the Springbrook Close pump station.



Existing Belmont Road Sewer Pump Station Catchment

Riverside Waters Zone 1

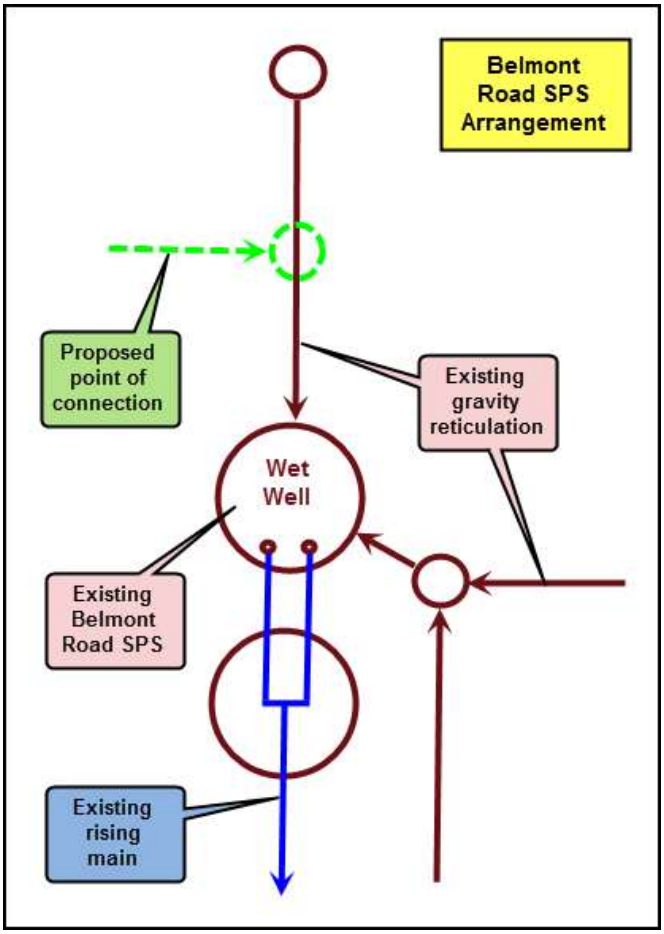
The following sketch shows where Zone 1 is to feed via gravity to the Belmont Road sewer pump station.



Riverside Water Zone 1 Gravity Connection

Point of Connection

The proposed point of connection to the existing sewer network is recommended to be via a new access chamber constructed over the existing sewer located north of the Belmont Road SPS.



Riverside Waters Connection to Existing Network

Catchment Limitations

The catchment capacity limitations are associated with the gravity sewer network located downstream from where the Belmont Road sewer pump station discharges. Recent network analysis confirms the gravity network has the capacity to accommodate an additional 300ET on top of the existing Samuel Crescent load.

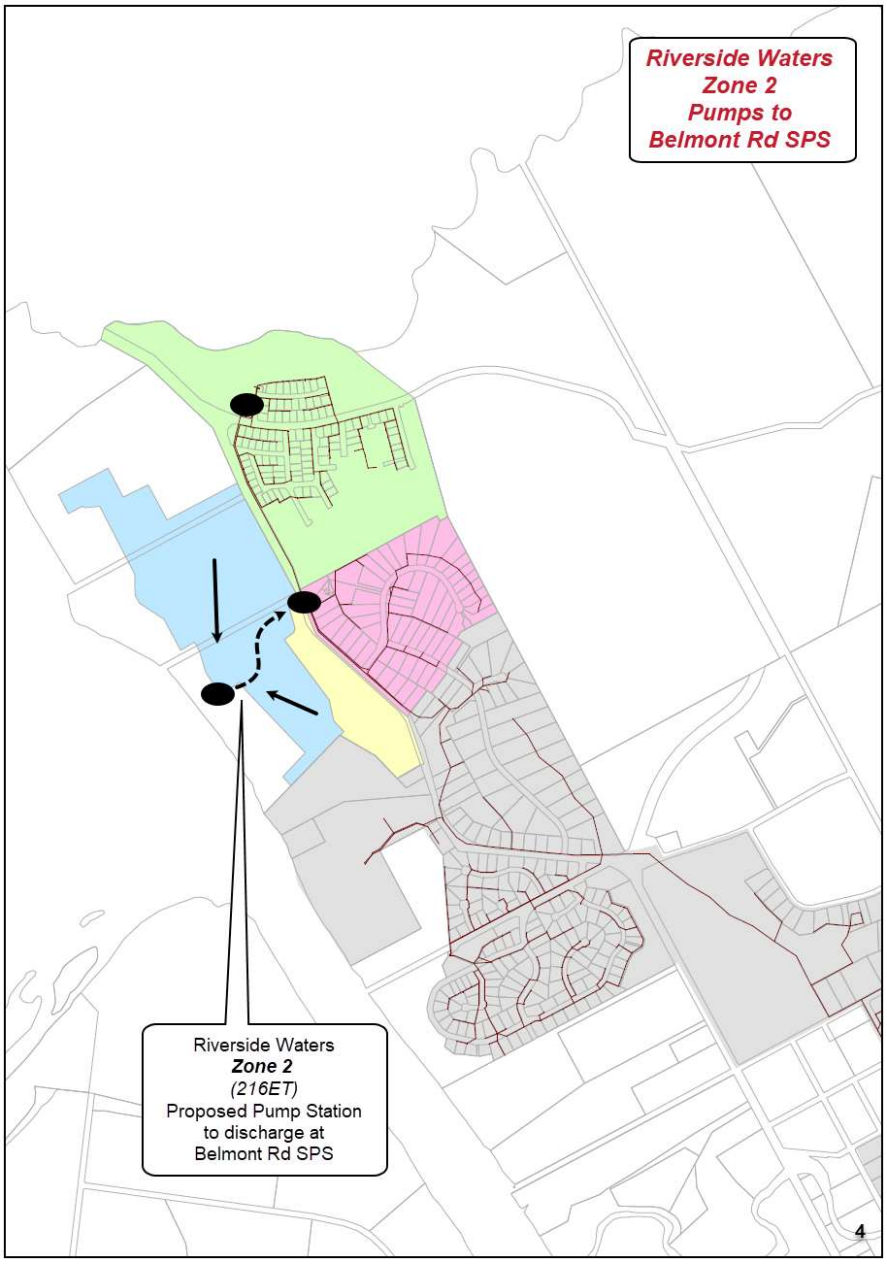
The Edenbrook development was originally granted temporary approval to discharge an additional 151ET into the Belmont Road sewer pump station until an alternative strategy would need to be implemented. Operational Works approvals for Edenbrook currently stand at approximately 120ET.

The available 180ET (300 available -120 Edenbrook) may be utilised by Edenbrook or Riverside Waters on a first come first serve basis of approved applications. Once triggered by either development, the Springbrook diversion scheme will need to be implemented (see below).

Riverside Waters Zone 2

It is assumed that the Riverside Waters Zone 2 may commence while Edenbrook is still connected to the Belmont Road sewer pump station.

The following sketch shows where Zone 2 feeds via gravity to the Proposed Riverside Waters sewer pump station.



Riverside Water Zone 2 Pumped Connection

Preliminary Pump station Sizing

The ultimate allotment yield for Zone 2 is 216ET

- The adopted sewer loading per EP is 200L/day
- The adopted EP per ET is 2.5
- ADWF = 200 / 3600 / 24

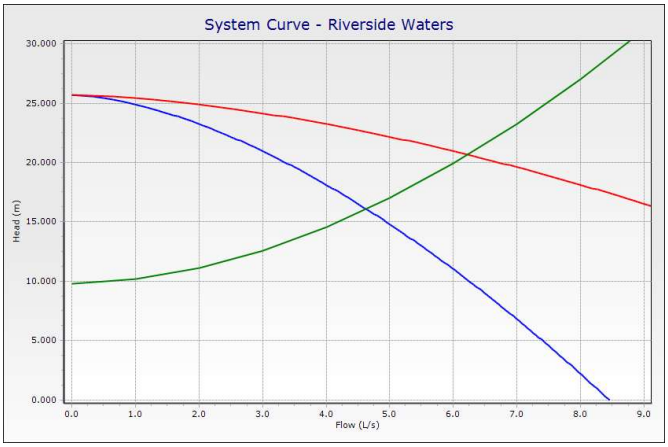
  = **0.0023 L/EP/s**

  = 0.0023 x 2.5 x 216

  = **1.3 L/s**
- PWWF = 5 x ADWF

  = 5 x 1.3

  = 6.5 L/s
- Length of Rising Main = 450m
- Diameter = 80mm
- Static Head = 10m



Riverside Waters Zone 2 – Pump Station System Curve

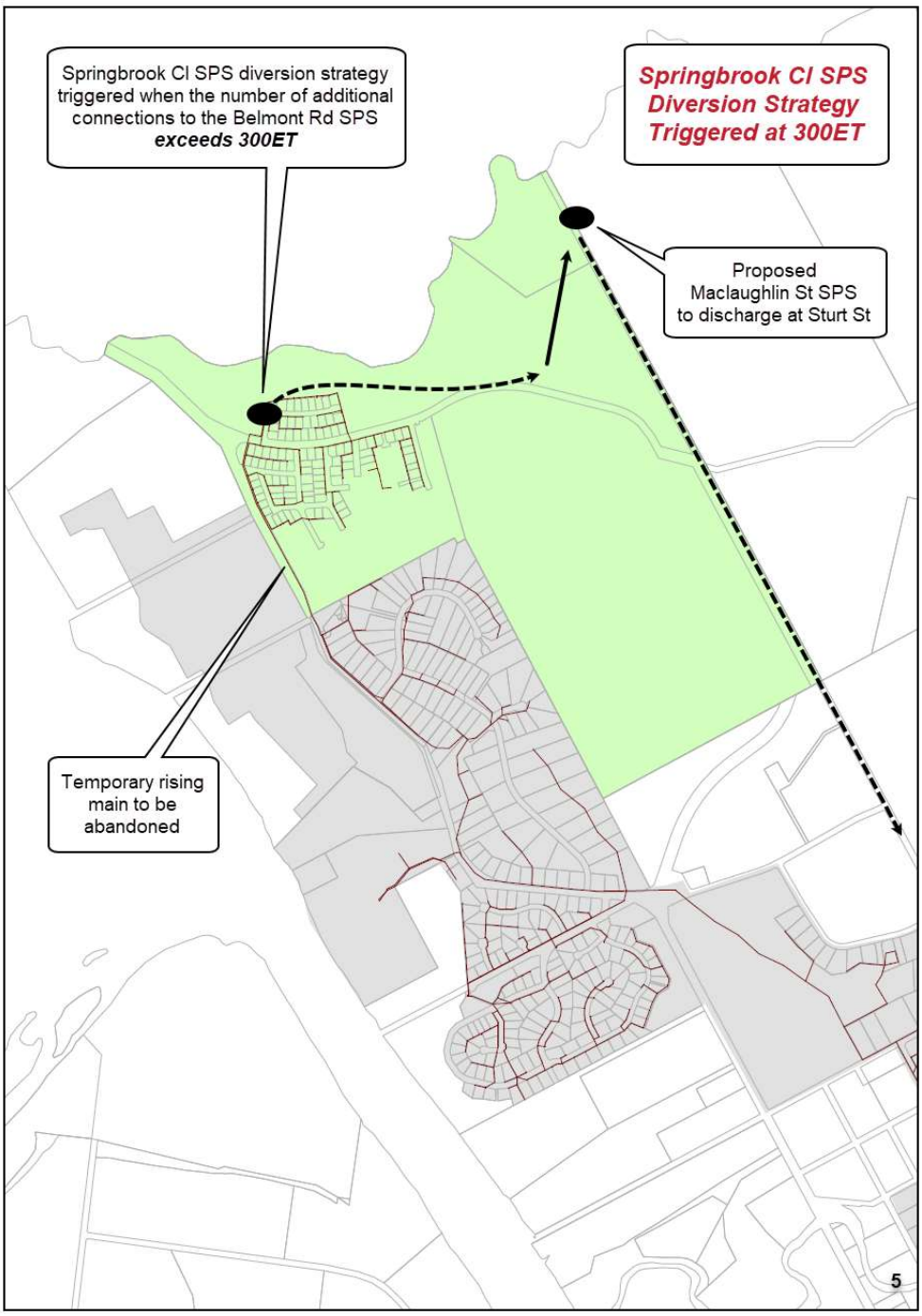
- Modelled Pumps CP 3060 HT 3-252 Rated Power 2.4kW

No of Pumps	Flow (L/s)	Head (m)	Efficiency (%)	Velocity (m/s)
1	4.80	16.2	51	0.95
2	6.37	20.9	46	1.27

Refer Attachment B Pump Operation Curves

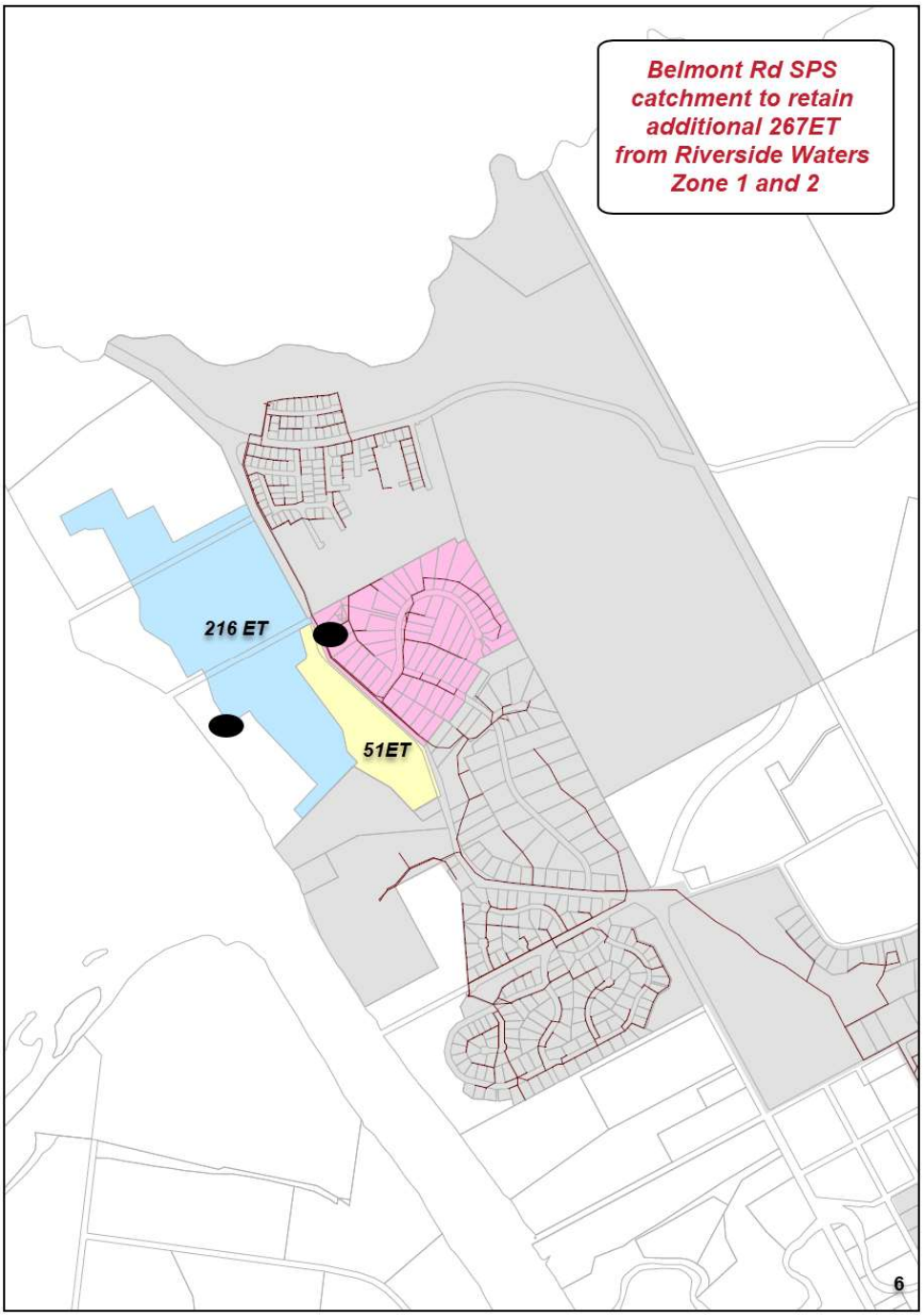
Catchment Limitation of 300 ET Triggered

It is assumed that the partial development of Zone 2 is likely to coincide with the catchment limitation trigger of 300ET being exceeded. This will trigger the implement the Springbrook Close sewer pump station diversion strategy. A high level sketch of the proposed diversion strategy is given below.



Springbrook Close Sewer Pump Station Diversion Strategy

With Edenbrook diverted this effectively enables Riverside Waters to utilise the additional capacity freed up at the Belmont sewer pump station. The total load on the Belmont Road sewer pump station from Riverside Waters is in the order of 267ET as shown below.

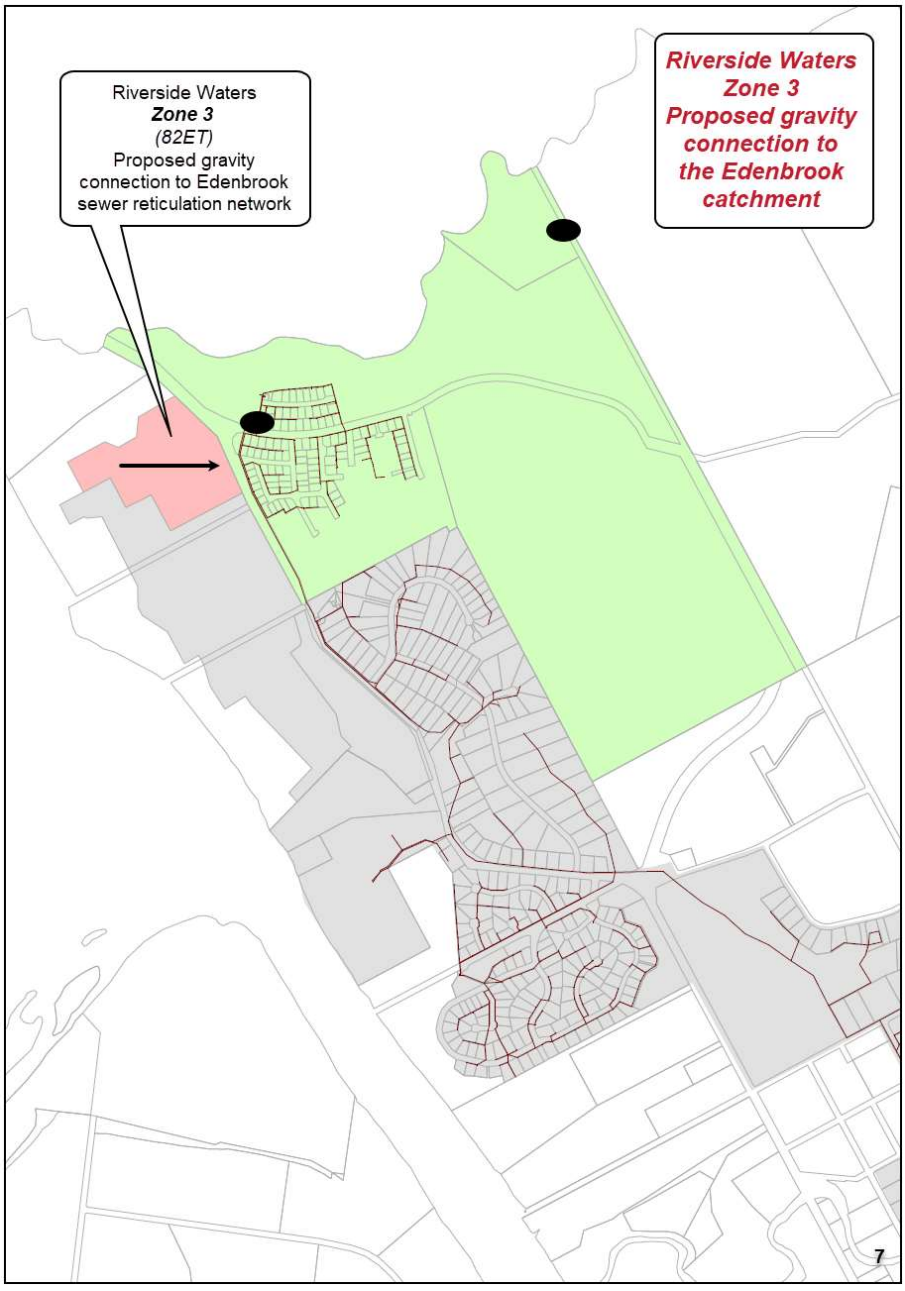


Total load on the Belmont Road sewer pump station from Riverside Waters is in the order of 267ET

It is noted that this is less than maximum allowable additional capacity of 300ET.

Riverside Waters Zone 3

The following sketch shows where Zone 3 is to feed via gravity into the Edenbrook sewer network.



Riverside Zone 3 to Discharge via Gravity into the Edenbrook Network

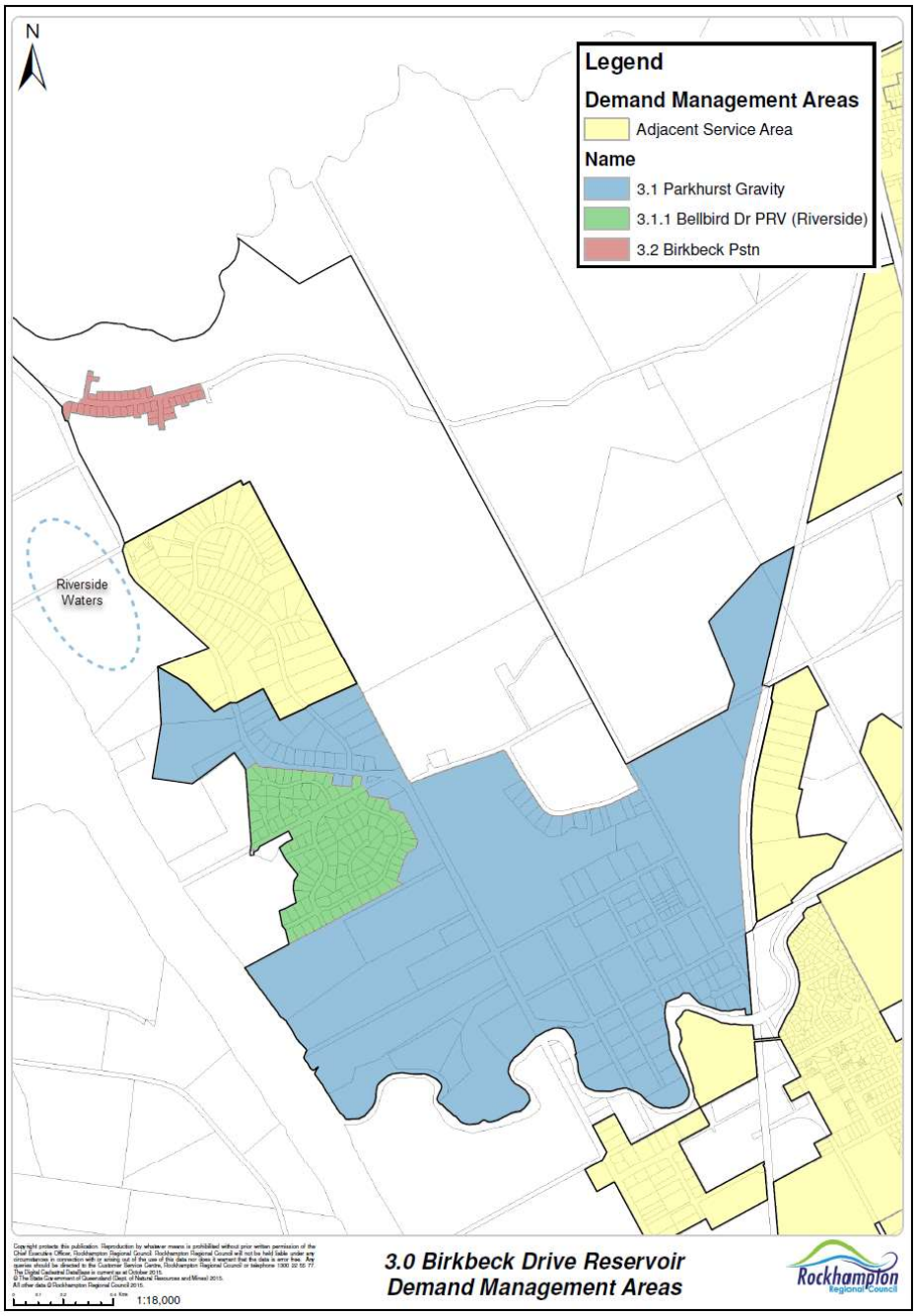
It is noted that as no sewer layout was provided for the proposed allotment layout within Lot 92 on SP224420, the gravity sewer within Zone 3 has been interpreted from the proposed finished contour sketch.

Water Network Analysis

Description of Analysis:

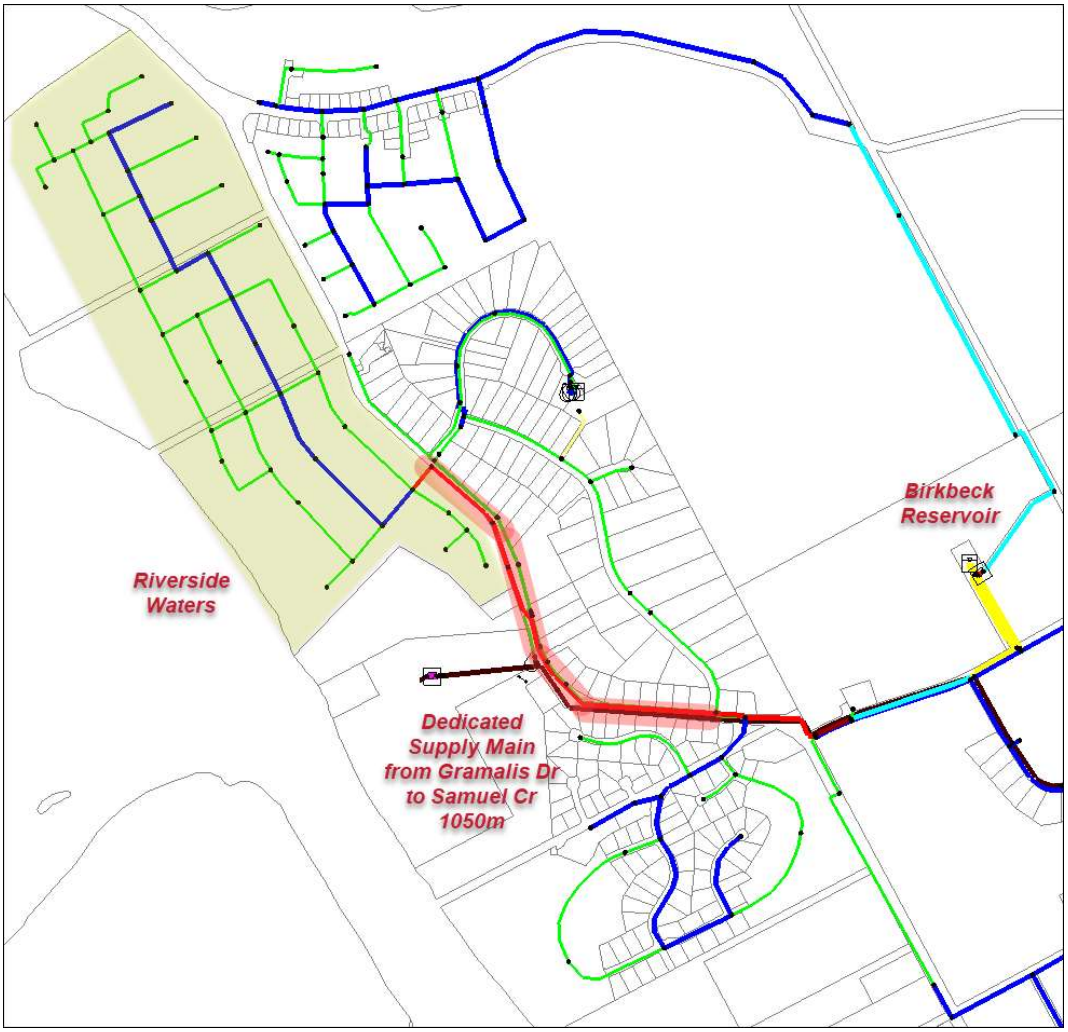
A water network analysis has been carried out for the 347 allotments proposed for the Riverside Waters development.

The following Demand Management Area map shows how the Riverside Waters development lies west of the Birkbeck reservoir Parkhurst Gravity area.



Birkbeck reservoir Parkhurst Gravity Service Area

It is proposed to service the development via a connection to the Parkhurst gravity zone. A dedicated supply main is proposed along Belmont Road between Gremalis Drive and Samuel Crescent as shown below.



Riverside Waters - Dedicated Supply Main

Network Analysis

Two scenarios were investigated for the 1,050m long supply main.

- 150mm Diameter Main
- 200mm Diameter Main

The scenarios were analysed to assess the capacity to provide a minimum service pressure of 220kPa and a fire fighting capacity of 15L/s at a minimum pressure of 120kPa.

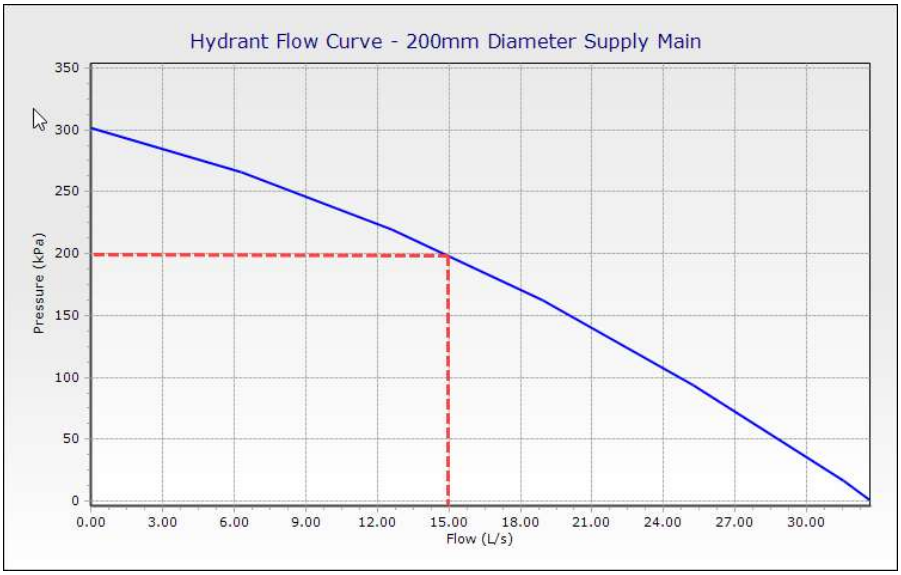
Results

The following table of results were taken from the critical node located at an elevation of 27m. They show that the 150mm diameter main was able to meet the minimum service pressure but could not provide the required fire flow achieving only 9L/s at 120kPa. The 200mm diameter remain meets all of the required design criteria.

Scenario Diameter (mm)	Residential		Fire Flow
	Residual Pressure (kPa)		Max @ 120kPa (L/s)
	Min	Max	
150	246	334	**9**
200	301	334	23

200mm Diameter Supply Main Scenario Meets the Design Criteria

The hydrant flow curve at the critical node for the 200mm diameter supply main scenario is given below.



Hydrant Flow curve at Critical Node for 200mm Diameter Supply Main

The pressure results for all modelled nodes are given on the following page including the recommended minimum pipe size diameters for the internal network.

Maximum and Minimum Pressure results for all modelled nodes
Recommended minimum pipe size diameters for the internal network.

Recommendations

Water:
The initial three stages (51ET) of the Riverside Waters development will require significant external water infrastructure with the construction of 1,050m of 200mm diameter main in Belmont Road from Gremalis Drive to Samuel Crescent. It is noted that the critical 900mm diameter primary supply main from the Glenmore Water Treatment Plant is located along half the length of this route. Extensive liaison with Fitzroy River Water is required to ensure there is no risk to this main during construction.

Sewer:
The initial three stages are able to connect via gravity to the Samuel Crescent sewer network that is serviced by the Belmont Road sewer pump station. It is noted that the Belmont Road sewer pump station has a limited capacity to receive an additional 300ET. The available 300ET may be utilised by Edenbrook or Riverside Waters on a first come first serve basis of approved applications. There is currently approved applications for approximately 120ET.

The future stages of Riverside Waters identified within this report as Zone 2 will require the construction of an internal sewer pump station to permanently discharge into the Belmont Road sewer pump station (via the Zone 1 gravity network).

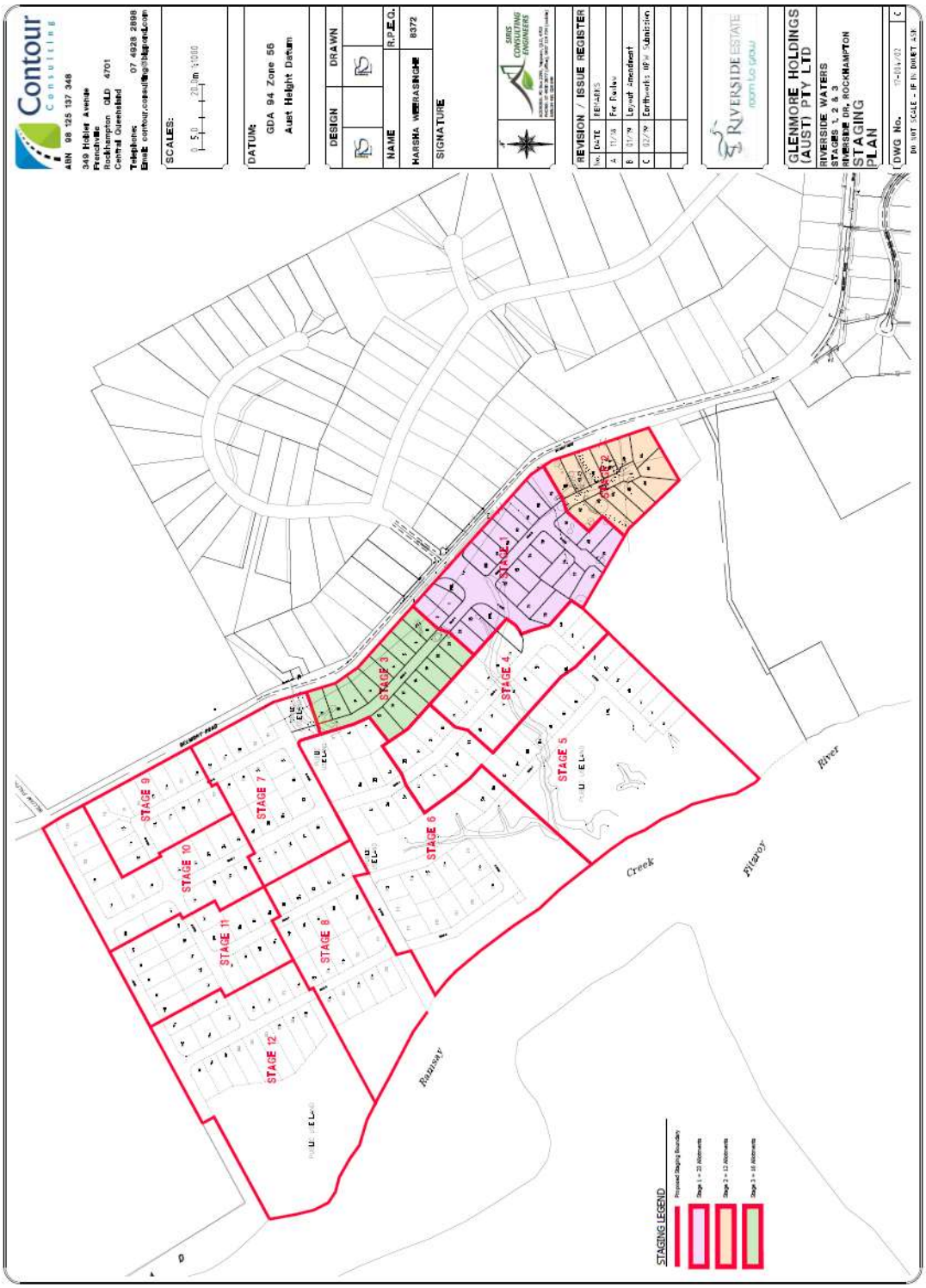
Zone 2 is comprised of 216ET. It should be noted that the full development of Zone 2 will not be able to occur until the "Springbrook Close Sewer Pump Station Diversion Strategy" has been implemented.

The future stage identified within this report as Zone 3 is to connect to the Edenbrook sewer network via gravity. The design of the "Springbrook Close Sewer Pump Station Diversion Strategy" will need to include capacity to accommodate the additional 82ET from Zone 3.

No sewer layout was provided for the proposed allotment layout within Lot 92 on SP224420. The potential for a gravity sewer layout within Zone 3 to discharge into the Edenbrook sewer network has been interpreted from the proposed finished contour sketch provided in Attachment A.

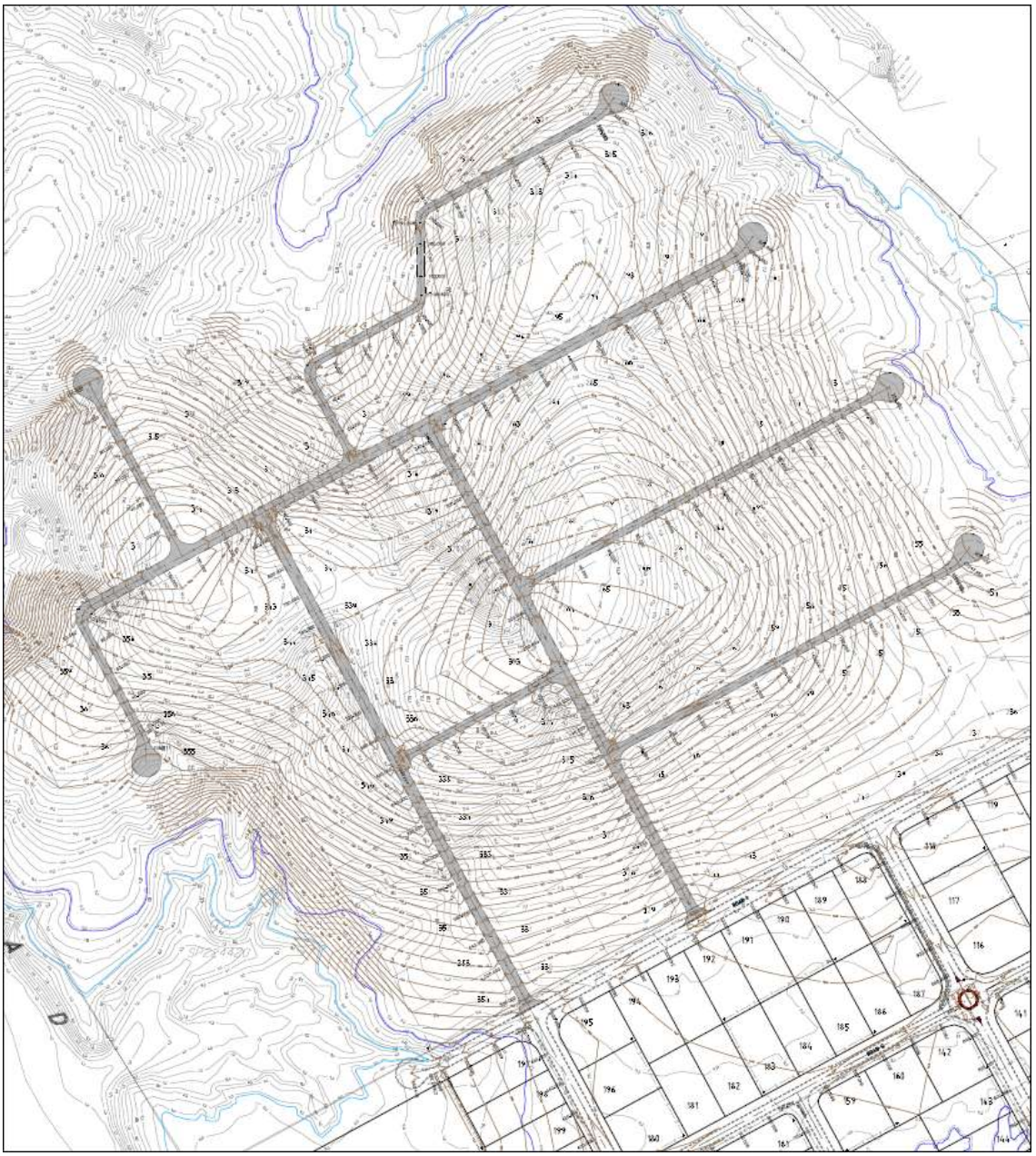
End of Report

Attachment A



Staging Plan for lot 103 on RP860099 and Lot 129 on PL4021

Overall Layout

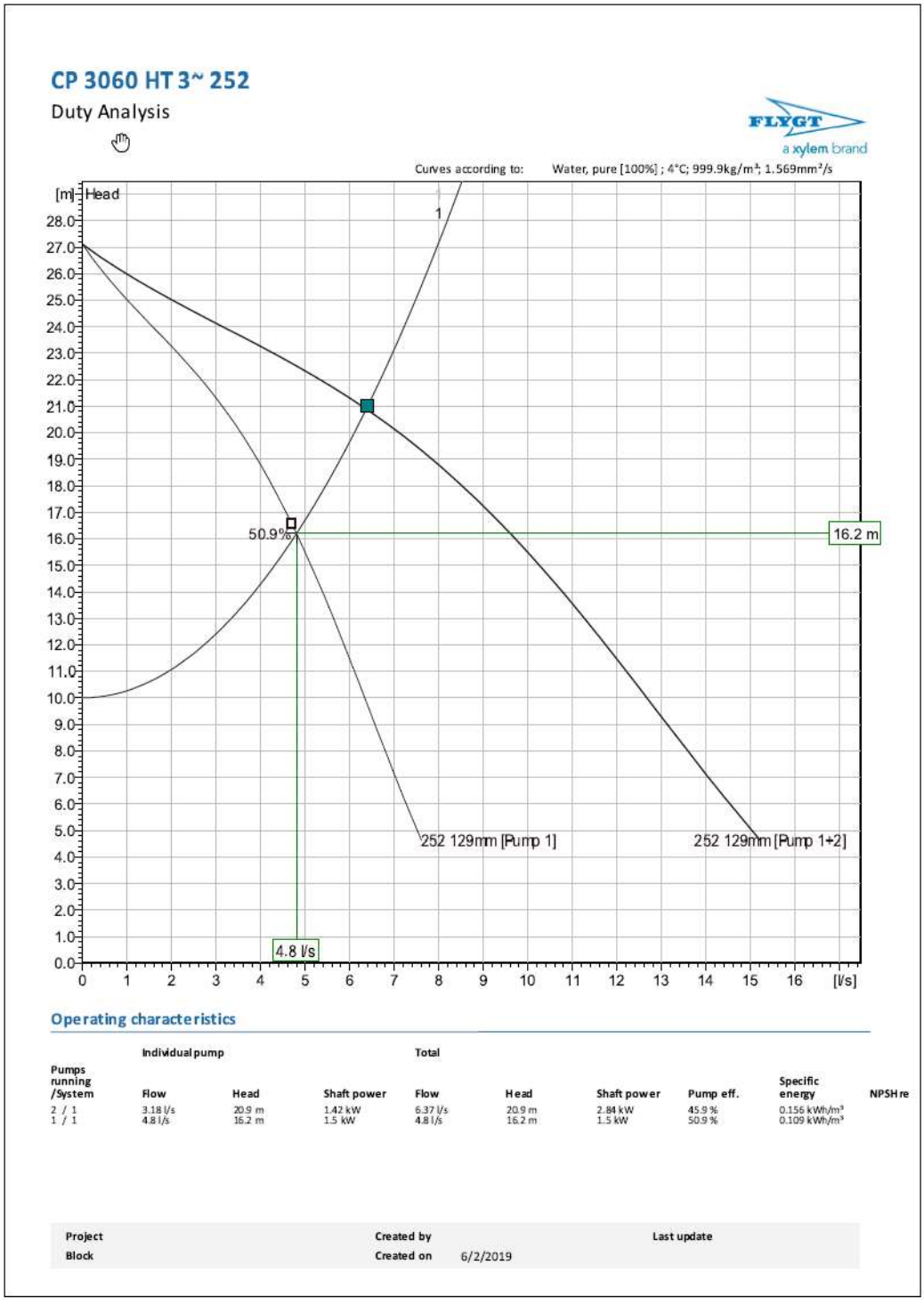


Proposed finished contours and allotment layout for Lot 92 on SP224420

Attachment B

Riverside

Internal Pump Station - Single Pump Operation



Operating characteristics

Pumps running /System	Individual pump Flow	Head	Shaft power	Total Flow	Head	Shaft power	Pump eff.	Specific energy	NPSHre
2 / 1	3.18 l/s	20.9 m	1.42 kW	6.37 l/s	20.9 m	2.84 kW	45.9 %	0.156 kWh/m³	
1 / 1	4.8 l/s	16.2 m	1.5 kW	4.8 l/s	16.2 m	1.5 kW	50.9 %	0.109 kWh/m³	

Project	Created by		Last update
Block	Created on	6/2/2019	

Riverside

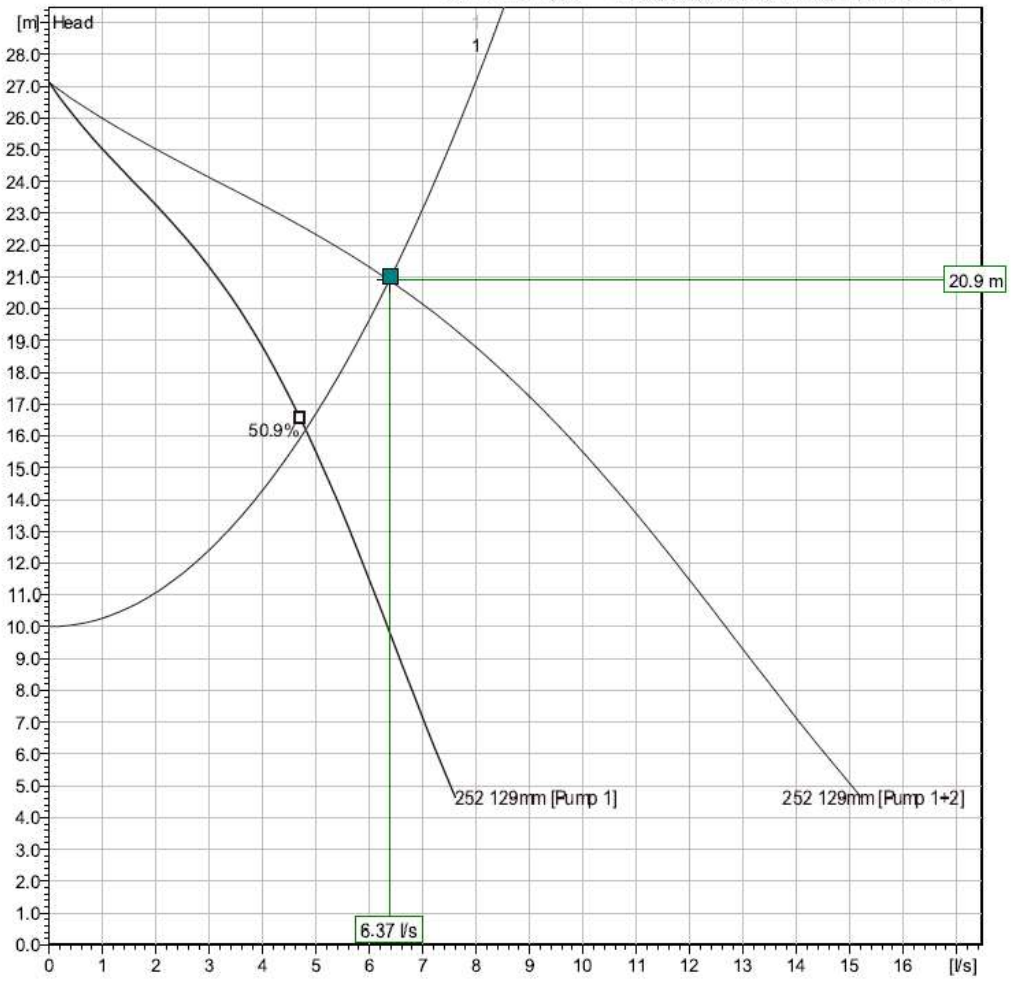
Internal Pump Station - Dual Pump Operation

CP 3060 HT 3~ 252

Duty Analysis

FLYGT a xylem brand

Curves according to: Water, pure [100%] ; 4°C; 999.9kg/m³; 1.569mm²/s



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1 / 1	4.8 l/s	16.2 m	1.5 kW	4.8 l/s	16.2 m	1.5 kW	50.9 %	0.109 kWh/m³	

Project	Created by		Last update
Block	Created on	6/2/2019	