

Pressurised Liquid Only Sewage Sewers for Unsewered Communities

New Zealand Examples and Summary of Capital Costs



Working for both Councils and private developers, Innoflow Technologies NZ Ltd brings over 26 years in technical design and construction expertise in decentralised wastewater schemes for rural and unsewered communities around New Zealand.

Specifically, Innoflow are specialists in the design, construction, and operation of pressurised liquid only sewers and AdvanTex® onsite wastewater treatment systems.

The use of pressurised liquid only sewers (Prelos™) which convey primary treated liquid from on-lot Prelos processor tanks and AdvanTex® wastewater treatment plants provide a number of key benefits to both developers, councils and homeowners, including;

- simple in design and resilient to fluctuating usage
- scalable, allowing for expandable system for growing communities and staged developments
- easy retrofit options for sites with existing septic tanks or infrastructure
- effective distribution of capital costs between developer (or utility) and homeowners
- low ongoing operating costs
- high quality components with long warranties (e.g. 10-year warranty on Prelos pumps)
- minimal visual impact and no noise
- produces consistently high quality treated effluent for effective reuse and land irrigation

There are between 50-60 such Prelos schemes (formerly known as STEP (septic tank effluent pump) schemes where STEP tanks are used on-lot) operating around New Zealand, with hundreds more around the world, including Australia and United States of America.

This document presents several New Zealand case studies with a summary of design, scheme components and capital costs of each of these examples shown here.



Figure 1- AdvanTex wastewater treatment plant that services the existing Lakeside Estate subdivision



Figure 2-Aerial shot of lakeside community (credit: ACH Consulting)



Figure 3-Aerial shot of subdivision (credit: central district surveys)



Figure 4-Photo from developed site at Hartwell Subdivision (credit: waterfordpress.co.nz)

Lakeside Estate Subdivision (Queenstown, New Zealand)-36 Lots

Existing community
Installation date: 2018
Client: Homeowner association

Number of lots and design volume:
36 lots, 1,000 L/day/lot, 36,000 L/day

Scheme summary:
Existing gravity sewer network and pump station
AX400 AdvanTex wastewater treatment plant
5,150 square meters of pressure compensating dripline

Design effluent quality
BOD₅ <20 mg/L
TSS <30 mg/L
TN <20 mg/L
E.coli <1000 cfu/100 mL

Cost of scheme:
Wastewater treatment plant: \$17,222 + GST/ lot. Includes supply and installation of wastewater treatment plant and land application area.

Cost per lot: \$17,222 + GST

Hartwell Lifestyle Subdivision (Palmerston North, New Zealand)-49 Lots

Greenfield development
Installation date: 2016 (staged development)
Client: Private developer

Number of lots and design volume (at stage 2 of 6):
21 lots, 900 L/day/lot, 18,900 L/day

Scheme summary:
21 Prelos tanks (installed by homeowner as part of house build)
Liquid only pressure sewer
AX200 AdvanTex wastewater treatment plant
6500 square meters of pressure compensating dripline

Design effluent quality
BOD₅ <15 mg/L
TSS <15 mg/L
TN <30 mg/L

Cost of scheme:
Prelos tank: \$13,500 + GST/lot. Average supply and install cost at each lot (purchased by homeowner as part of house build)
Wastewater treatment plant: \$20,600 + GST/ lot (average over 3 construction phases). Includes supply and installation of boundary connections, effluent sewer and installation of wastewater treatment plant and land application area.

Cost per lot: \$32,040 + GST



Figure 5-Aerial shot of the Peak Road subdivision

Peak Road Subdivision (Auckland, New Zealand)-51 Lots

Greenfield development
Installation date: 2014
Client: Private developer

Number of lots and design volume:
51 lots, 1,080 L/day/lot, 55,080 L/day
1 community church, 250 L/day
Farm Barn, 1,080 L/day

Scheme summary:
51 Prelos tanks (installed by homeowners as part of house builds)
Liquid only pressure sewer
AX600 AdvanTex wastewater treatment plant
18,805 square meters of pressure compensating dripline

Design effluent quality
BOD₅ <15 mg/L
TSS <15 mg/L
TN <30 mg/L (12 month average)
Faecal Coliforms <200 cfu/100 mL

Cost of scheme:

Prelos tank: \$13,500 + GST/lot. Average supply and install cost at each lot (purchased by homeowner as part of house build)
Wastewater treatment plant: \$8,865 + GST/ lot. Includes supply only of boundary connections, effluent sewer and supply and installation of wastewater treatment plant and land application area.

Cost per lot: \$23,300 + GST



Figure 6-Photo of land application area which is irrigated by treated effluent from the Peak Road subdivision

Ongare Point Coastal Community (Bay of Plenty, New Zealand)-58 Lots

Established community
Installation date:
Client: Western Bay of Plenty District Council

Number of lots and design volume:
58 lots, 690 L/lot, 40,000 L/day

Scheme summary:
58 STEP tanks (installed at each house, including retrofits)
Pressurised liquid only sewer
AdvanTex® AX400 Wastewater Treatment Plant
55,400 square meters of pressure compensating dripline laid through bush

Design effluent quality
BOD: <20 mg/L
TSS: <20 mg/L
E.coli: <500 mpn/100mL

Cost of scheme:

STEP tank: \$8,840 + GST/lot. Average supply cost to Council
Wastewater treatment plant cost: \$7,890 + GST/ lot. Includes supply of boundary connections and installation of wastewater treatment plant and land application area.

Cost per lot: \$17,070 + GST
(excludes STEP tank installation and effluent sewer)



Figure 7-Photo of AdvanTex wastewater treatment plant installed to service the Ongare Point community



Figure 8-Aerial photo of the existing Ongare Point community



Figure 9-Aerial photo of planned subdivision at Sylvan Estate

Sylvan Estate Subdivision (Auckland, New Zealand)-65 Lots

Greenfield development

Installation date: 2019

Client: Private developer

Number of lots and design volume:
65 lots, 900 L/day/lot, 58,500 L/day

Scheme summary:

65 Prelos tanks (installed as part of house builds)

Liquid only pressure sewer

AX500 AdvanTex wastewater treatment plant

14,625 square meters of pressure compensating dripline

Design effluent quality

BOD₅ <20 mg/L

TSS <20 mg/L

TN <30 mg/L

NH₃-N <10 mg/L

TP <15 mg/L

Faecal Coliforms <200 cfu/100 mL

Cost of scheme:

Prelos tank: \$13,500 + GST/lot. Average supply and install cost at each lot (purchased by homeowner as part of house build)

Wastewater treatment plant: \$5,980 + GST/ lot. Includes supply of boundary connections and installation of wastewater treatment plant and land application area.

Cost per lot: \$21,650 + GST
(excludes effluent sewer)

Opito Bay Community (Coromandel, New Zealand)-76 Lots

Greenfield development

Installation date: 2019

Client: Private developer, then Thames Coromandel District Council

Number of lots and design volume:
76 lots, 1,560 L/day/lot, 119,000 L/day

Scheme summary:

76 Prelos tanks (installed as part of house builds)

Liquid only pressure sewer

AX900 AdvanTex wastewater treatment plant

14,108 square meters of pressure compensating dripline

Design effluent quality

BOD₅ <20 mg/L

TSS <20 mg/L

TN <30 mg/L

NH₃-N <10 mg/L

TP <15 mg/L

Faecal Coliforms <200 cfu/100 mL

Cost of scheme:

Prelos tank: \$13,500 + GST/lot. Average supply and install cost at each lot

Wastewater treatment plant: \$12,747 + GST/ lot. Includes supply of boundary connections, effluent sewer and installation of wastewater treatment plant and land application area.

Cost per lot: \$26,247 + GST



Figure 10-Photo of AdvanTex wastewater treatment plant at Sylvan Estate



Figure 11-Aerial photo of Opito Bay and location of planned subdivision



Figure 12-Photo of AdvanTex wastewater treatment plant at Opito Bay



Figure 13-Photo of AdvanTex wastewater treatment plant at Matauri Bay

Matauri Bay Subdivision (Far North, New Zealand)-154 Lots

Greenfield development
Installation date: 2007
Client: Private developer

Number of lots and design volume:
154 lots, 1,075 L/lot, 166,000 L/day

Scheme summary:
154 STEP tanks (to be installed by homeowner as part of build)
Pressurised liquid only sewer
AdvanTex® AX1600 Wastewater Treatment Plant
55,400 square meters of pressure compensating dripline laid through bush

Design effluent quality
BOD: <20 mg/L
TSS: <30 mg/L

Cost of scheme:

Prelos tank: \$13,500 + GST/lot. Average supply and install cost at each lot.
Wastewater treatment plant: \$6,900 + GST/ lot. Includes boundary connections, effluent sewer, wastewater treatment plant and land application area.

Cost per lot: \$20,400 + GST



Figure 14-Photo of communal land application area at Matauri Bay



Waipatiki Beach Community (Hawkes, New Zealand)-76 Lots

Greenfield development
Installation date: 2006
Client: Hastings District Council

Number of lots and design volume:
76 lots, 1,000 L/day/lot, 76,000 L/day

Scheme summary:
76 Prelos tanks (installed as part of house builds)
Liquid only pressure sewer
AX600 AdvanTex wastewater treatment plant
15,200 square meters of pressure compensating dripline

Design effluent quality
BOD₅ <20 mg/L
TSS <30 mg/L

Cost of scheme:

Prelos tank: \$13,500 + GST/lot. Average supply and install cost at each lot
Wastewater treatment plant: \$12,630 + GST/ lot. Includes supply of boundary connections, effluent sewer and installation of wastewater treatment plant and land application area.

Cost per lot: \$17,425 + GST



Figure 15- Photo of Waipatiki Beach and wastewater treatment plant to service the community



Figure 16-Photo of AdvanTex wastewater treatment plant at Piopio Community



Figure 17-Photo of Mokau River where highly treated effluent is discharged to

Piopio Community (Waikato, New Zealand)- 198 Lots

Established community
Installation date: 2007
Client: Waitomo District Council

Number of lots and design volume:
198 lots, 1,145 L/lot, 227,000 L/day (including school)

Scheme summary:
198 STEP tanks (installed at each house)
Pressurised liquid only sewer
AdvanTex® AX1200 Wastewater Treatment Plant
Rock outfall
Discharge into Mokau River

Design effluent quality
BOD₅ <20 mg/L
TSS <30 mg/L
TKN <30 mg/L
NH₃-N <10 mg/L
TP <15 mg/L
Faecal Coliforms <500 mpn/100 mL

Cost of scheme:

STEP tank: \$7,000 + GST/lot. Supply and install cost at each lot
Wastewater treatment plant cost: \$10,100 + GST/ lot. Includes supply and install of boundary connections, effluent sewer and wastewater treatment plant

Cost per lot: \$17,100 + GST

Lake Rotoma Lakeside Community (Rotorua, New Zealand)-234 Lots

Established community
Installation date: 2018
Client: Rotorua Lakes Council

Number of lots and design volume:
234 lots, 1,000 L/day/lot, 234,000 L/day

Scheme summary:
234 STEP tanks (installed at each house) connected to council mains and council wastewater treatment system

Design effluent quality
Primary treated wastewater

Cost of scheme:

Prelos tank: \$7,750 + GST/lot.
Supply only to council.



Figure 18-Aerial photo of Lake Rotoma and surrounding area



Figure 19-Photo of on-lot tank being installed



Figure 20-Aerial photo of Mahia Beach township

Mahia Beach Township (Hawkes Bay, New Zealand)-375 Lots

Established community
Installation date: 2015
Client: Wairoa District Council

Number of lots and design volume:
375 lots, 1,000 L/day/lot, 375,000 L/day

Scheme summary:
375 concrete STEP tanks (installed at each house) connected to council mains

Design effluent quality
Primary treated wastewater

Cost of scheme:
STEP tank: \$5,200 + GST/lot.
Supply only of concrete STEP tanks to council.



Figure 21-Photo of on-lot tanks

Jacks Point (Otago, New Zealand)- 750 Lots

Greenfield, expanding development
Installation date: 2006-current (wastewater scheme continues to be upgraded as the development grows)
Client: Private developer

Number of lots and design volume:
Planned 750 lots, of which 484 homes are built and connected to scheme across 7 neighbourhoods (N1 to N7). Also includes connection from golf club, restaurant and offices.

Scheme summary:
484 (out of planned 750) STEP tanks (installed at each house)
Pressurised liquid only sewer
3 wastewater treatment plants and 3 land application areas servicing 3 clusters of neighbourhoods;
N1-N4 plant: 412 lots connected
N2-N3 plant: 164 lots connected
N5, 6,7 plant: 182 lots connected
76,000 square meters of pressure compensating dripline

Design effluent quality
BOD: <15 mg/L
TSS: <20 mg/L
TN: <20 mg/L
TP: <12 mg/L
E.coli: <10,000 mpu/100mL

Cost of scheme:
Prelos tank: \$16,000 + GST/lot. Average supply and install cost at each lot.
Wastewater treatment plant: \$7,500 + GST/ lot. Average cost of construction which includes supply of boundary connections, effluent sewer and installation of wastewater treatment plant and land application area.

Cost per lot: \$23,500 + GST



Figure 22-Photo of 1 of 3 decentralised wastewater treatment plants at Jacks Point (N567 plant)

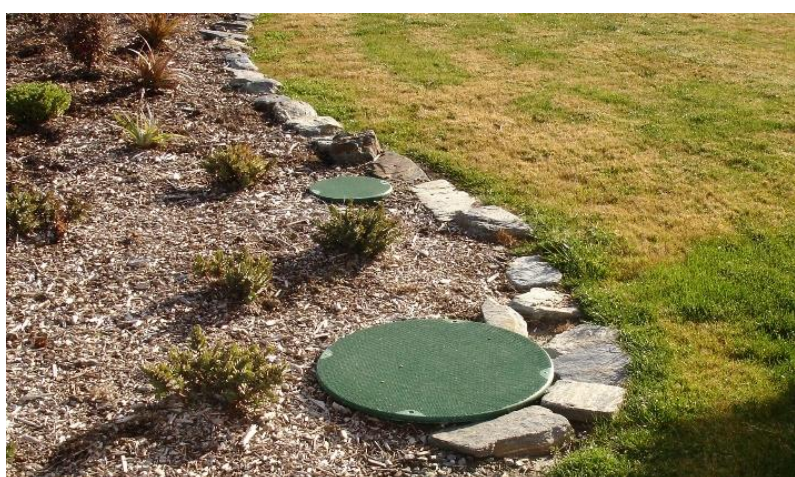


Figure 23-Picture of an installed on-lot tank at Jacks Point

Contact Innoflow for Design and Pricing Information

Innoflow can design and price wastewater systems for existing or new unsewered communities
We can be contacted on +64 9 426 1027 or salma@innoflow.co.nz