REPORT

SUBJECT:	**Acceptance of Tenders for Contracts C1009A, Taihape Wastewater and C1009B, Water Treatment Plants – Supply of Lamella Clarifiers**
TO:	Rangitikei District Council
FROM:	Hamish Waugh, General Manager Infrastructure
DATE:	17 December 2015
FILE:	C1009

1. Purpose of the report

The purpose of this report is to recommend acceptance of two tenders from Service Engineers Ltd for the supply of lamella clarifiers for the Taihape wastewater and water treatment plants.

2. Key issues

The Taihape Wastewater Treatment Plant currently has a membrane (screen) to remove algae and suspended solids from treated pond effluent before it discharges to the Hautapu River. The presence of algae in the treated effluent is reflective of a healthy treatment pond environment and is no reason for concern.

The membrane filters out algae in the wastewater and is backwashed on a regular basis to remove any build up. Operationally this screen has proven to be less than satisfactory because backwashing does not remove all of the accumulated algae and suspended solids. Hand cleaning of the screen is required to remove this material, it is time consuming and the benefits are of short duration.

Installing a clarifier to remove the algae and suspended solids from the treated effluent before it passes through the membrane will be a significant process improvement and one that will have significant benefits both operationally and in meeting resource consent conditions.

The tender for the wastewater treatment plant also included the supply of a flash mixer and flocculation tank. These are included in the tender price.

The existing clarifier at the Taihape Water Treatment Plant is constructed from concrete and removes suspended solids from the raw water as it enters the treatment plant. While this clarifier is performing well, the concrete structure is cracked and uneconomic to repair.

A flash mixer and flocculation tank are already in place at the water treatment plant and will be reused.

Since Rangitikei District Council needed two clarifiers in Taihape it was felt that tendering both at the same time would provide the most competitive rates.

To assist Councillors who are unfamiliar with the operation of clarifiers, to understand this procurement, a brief overview of the functioning of lamella clarifiers, flash mixers and flocculation tanks is provided in Appendix A.

3. Tenders Received

Requests for Proposal (tenders) for the supply of lamella clarifiers were advertised on TenderLink in late October 2015 and closed on 16 November 2015. Eight tenders were received and evaluated.

One of the tenders was considered to be non-conforming as it did not address the requirements of the tender document and little of the requested information was submitted. Additionally, the clarifiers proposed did not meet tender specifications as they can only treat (clarify) 5% of the specified through-flow. This tender was therefore removed from the evaluation process.

The table below lists the tenders received ranked by price. To preserve confidentiality only the name of the preferred tenderer has been given.

Table A – Tenders Received

Tenderer	Wastewater Tender Price (excl. GST)	Water Supply Tender Price (excl. GST)	Combined Tender Price (excl. GST)
Service Engineers Ltd	$188,118.00	$197,120.00	$385,238.00
Tenderer A	$231,805.66	$278,865.91	$510,671.57
Tenderer B	$246,790.00	$284,970.00	$531,760.00
Tenderer C	$343,841.50	$443,200.50	$787,042.00
Tenderer D	$380,900.00	$360,900.00	$741,800.00
Tenderer E	$482,439.22	$382,277.33	$864,716.55
Tenderer F	$501,735.00	$248,073.00	$749,808.00

The Engineer's estimate for this project was $200,000 (excl. GST) for each clarifier. All tenders include a small contingency.

Tenders were evaluated using an amended version of the Weighted Attributes Method. The following weightings were used:

Attribute	Weighting
Relevant Experience of personnel including that of Sub-Contractors	15%
Track Record including that of Sub-Contractors	15%
Management Skills and Resources including that of Sub-Contractors	10%
Methodology and Programme including that of Sub-Contractors	10%
Price	50%
Total	100%

4. Tender Evaluation

The rankings, post the tender evaluation process, are attached as Appendix B. Service Engineers Ltd, the highest ranked tenderer, is a privately owned mechanical and heavy engineering company based in Auckland and has been in business for 30 plus years.

Over the last 15 years, Service Engineers Ltd has been involved in the water and wastewater treatment industries and is now one of the larger mechanical engineering contractors within this industry sector in New Zealand with ongoing contracts for potable water and wastewater treatment plants in the public and private sectors. Service Engineers Ltd also has international clients.

Service Engineers Ltd tender submissions demonstrated a thorough understanding of the requirements of the project and provided sufficient information for the Tender Evaluation Team to determine that they have the resources and commitment to complete the project on time, within budget and to the required quality standard.

Service Engineers Ltd specialist area is mechanical engineering and the fabrication of process equipment. The design of the clarifiers will be undertaken by GEA of Germany, one of the world's largest suppliers of equipment for the processing industry. The GEA group focuses on the design and fabrication of process technology equipment and components, including clarifiers and other water and wastewater treatment systems.

The GEA group employs approximately 18,000 people worldwide and is listed on Germany's MDAX stock index and on the STOXX Europe 600 Index. GEA designed equipment is used widely within the New Zealand water and wastewater industries.

GEA has the expertise and experience to design lamella clarifiers for the purpose intended, and Service Engineers Ltd has the specialist knowledge and skills to fabricate the lamella clarifiers to GEA's designs.

5. Alternative Tenders

Lamella clarifiers can be fabricated from epoxy coated steel or stainless steel, among other materials. The life of an epoxy coating is generally 15 to 20 years after which time the unit needs to be stripped back to bare metal and recoated.

The life of stainless steel clarifiers is as a minimum 30 to 40 years. Stainless steel clarifiers are preferred by Council's operations team due to their longevity.

The Request for Proposal invited tenders for both epoxy coated steel with the option of submitting a price for stainless steel. A number of tenderers submitted tenders for both, but Service Engineers Ltd did not. During the tender evaluation process a request was made to Service Engineers Ltd to provide a price for stainless steel and this was duly provided.

The additional costs for Service Engineers Ltd to fabricate the lamella clarifiers from stainless steel are detailed in the following table:

Table B – Additional Costs for Stainless Steel, Service Engineers Ltd

Clarifier Location	Budget for Clarifiers and Facilitation Work ①	Tendered Sum for Supply of Clarifiers (excl. GST)	Additional Cost for Stainless Steel Clarifiers (excl. GST)	Contract Price for Stainless Steel Clarifiers (excl. GST) ②	Funding Available for Facilitation Works to Install Clarifiers ① - ②
Wastewater Treatment Plant	$450,000	$188,118	$44,400	$232,518	$217,482
Water Treatment Plant	$389,000	$197,120	$46,100	$243,220	$145,780
Total Tendered Sum		**$385,238**	**$90,500**	**$475,738**	

For cost comparison purposes, Tenderer A submitted a price for stainless steel clarifiers of $649,374-57 (excl. GST) and $510,671-57 (excl. GST) for epoxy coated steel clarifiers, a difference of $138,703-00 (excl. GST). This confirms that the price from Service Engineers Ltd of $90,500 (excl. GST) is competitive and not inflated post the closing of tenders.

The scope of the facilitation works at the Taihape Wastewater Treatment Plant includes, but is not limited to, the design and construction of engineered foundations for the clarifier, the fabrication and installation of galvanised stairs and walkways, the fabrication and installation of connecting pipework, valves, fittings, etc., upgrades to the SCADA system, and a range of associated works.

The scope of the facilitation works at the Taihape Water Treatment Plant are similar, although the existing clarifier steps and walkways will be dismantled, modified and reused.

The scale of each aspect of the facilitation works is relatively minor in comparison to the supply of the lamella clarifiers and, as such, quotes will be

invited from local contractors experienced in the relevant discipline. It is envisaged that these works will be within the authority delegated to officers to accept; however, if these works exceed the delegated authority Council will be requested to approve the works.

6. Major recommendations

The first recommendation is to accept the tender for the supply of a Lamella clarifier for the Taihape Wastewater Treatment Plant from Service Engineers Ltd in the sum of $234,218 (excl. GST), noting that this sum is for clarifiers fabricated from stainless steel. The additional cost for stainless steel is $46,100 (excl. GST).

The second recommendation is to accept the tender for the supply of a Lamella clarifier, a flash mixer and a flocculation tank for the Taihape Water Treatment Plant from Service Engineers Ltd in the sum of $241,520 (excl. GST), noting that this sum is for equipment fabricated from stainless steel. The additional cost for stainless steel is $44,400 (excl. GST).

7. Budget

Provisions were made in the 2015/2016 Annual Plan budgets for the installation of new/replacement clarifiers at the wastewater and water treatment plants, and for facilitation works including pipework and upgrades to the SCADA systems. The relevant budgets are:

- Wastewater treatment plant $450,000
- Water Treatment Plant $389,000

8. Conclusion

The preferred option is to accept the tenders from Service Engineers Ltd for the supply of the stainless steel lamella clarifiers due to their greater life expectancy and the competitive price offered for this alternative.

9. Recommendations

i. That the report on "Acceptance of Tenders for Contracts C1009A, Taihape Wastewater and C1009B, Water Treatment Plants – Supply of Lamella Clarifiers" be received.

ii. That Contract *C1009A Taihape Wastewater Treatment Plant – Supply of a Lamella Clarifier* be awarded to Service Engineers Ltd for the sum of two hundred and thirty four thousand two hundred and eighteen dollars, noting this sum is for the supply of a clarifier fabricated from stainless steel and that the extra cost for this material is $46,100 (excl. GST).

iii. That *Contract C1009B Taihape Water Treatment Plant – Supply of a Lamella Clarifier, a Flash Mixer and a Flocculation Tank* be awarded to Service Engineers Ltd for the sum of two hundred and forty one thousand five hundred and twenty dollars ($241,520-00 excl. GST), noting this sum

is for the supply of a clarifier fabricated from stainless steel and that the extra cost for this material is $44,400 (excl. GST).

Hamish Waugh
General Manager Infrastructure

Appendix A –Lamella Clarifiers

To assist Councillors who are unfamiliar with clarifiers to understand this procurement, a brief overview of the functioning of lamella clarifiers, flash mixers and flocculation tanks is provided below, followed by diagrams showing the operation of lamella clarifiers. This information has been obtained from Wikipedia and other sources.

Lamella clarifiers (inclined plate and/or tube clarifiers) are designed to remove sediment and impurities from liquids. They are often employed in water or wastewater treatment and use a series of inclined plates or tubes that provide a large effective settling area for a small footprint. They are also used in the mining and food processing industries.

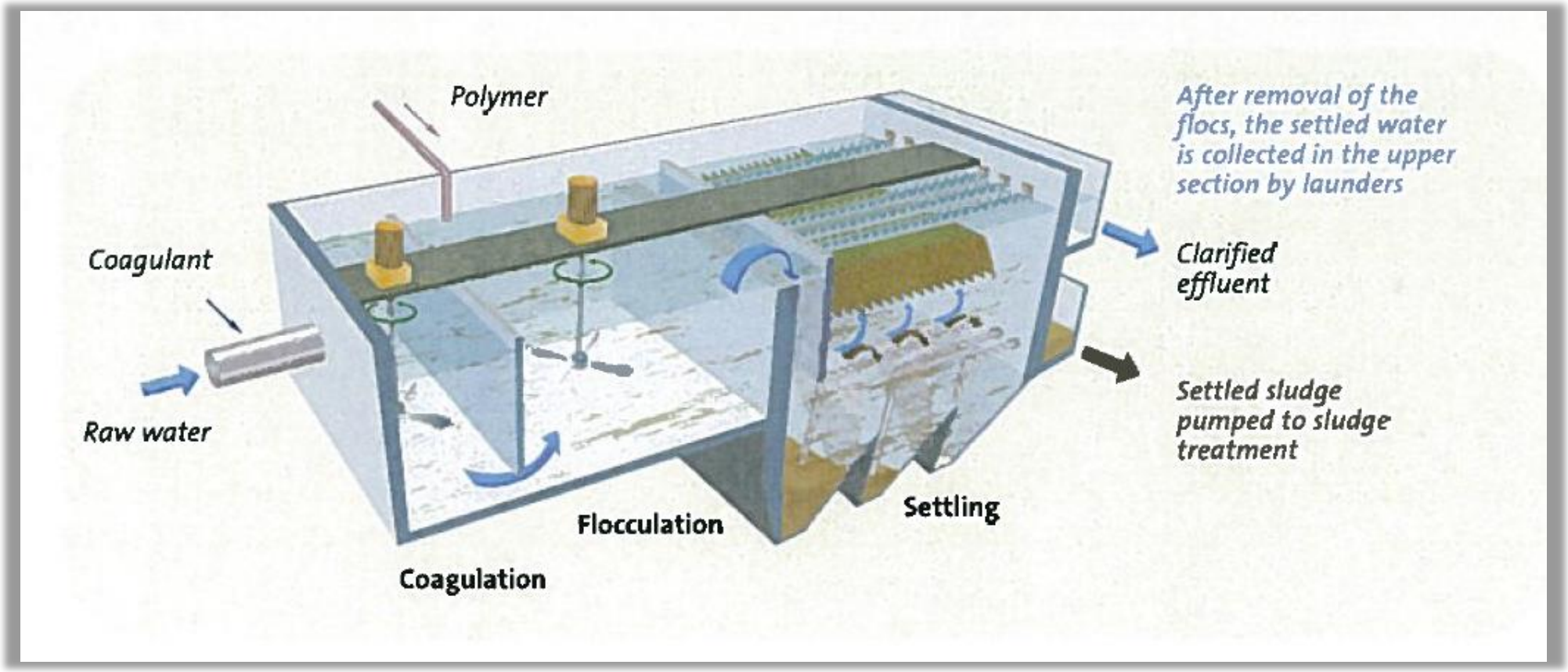
Raw water or treated effluent that contains sediment or other impurities enters a coagulant chamber or **flash mixer** where a coagulant and other chemicals are added and vigorously agitated to blend them together. This agitation results in almost instantaneous mixing. The chemical/water or chemical/wastewater mix then flows into a **flocculation tank** where the particles begin to flocculate and form larger sized clusters or floccs.

The flocculated water, or wastewater, then enters the lamella settling tank where it is stilled to allow the floccs to continue forming before it slowly flows up between/through the lamella plates/tubes. Solid particles (floccs) begin to settle on the plates/tubes and, due to their weight and the effect of gravity, they slide down and begin to accumulate in collection hoppers at the bottom of the clarifier unit. The resultant sludge is drawn off at the bottom of these hoppers and the clarified water exits the unit at the top of the clarifier over a weir, sometimes referred to as a launder.

At the wastewater treatment plant the clarified water will pass from the clarifier and through the membrane filter to remove any fine particles remaining and from there it will be discharged into the Hautapu River.

At the water treatment plant the clarified water will enter the existing flash mixer and clarifier before entering the treatment system and then the reservoir.

Schematic of Flash Mixer, Flocculation Tank and Lamella Clarifier



Section through Lamella Settling TankSection through Lamella Plates or Tube

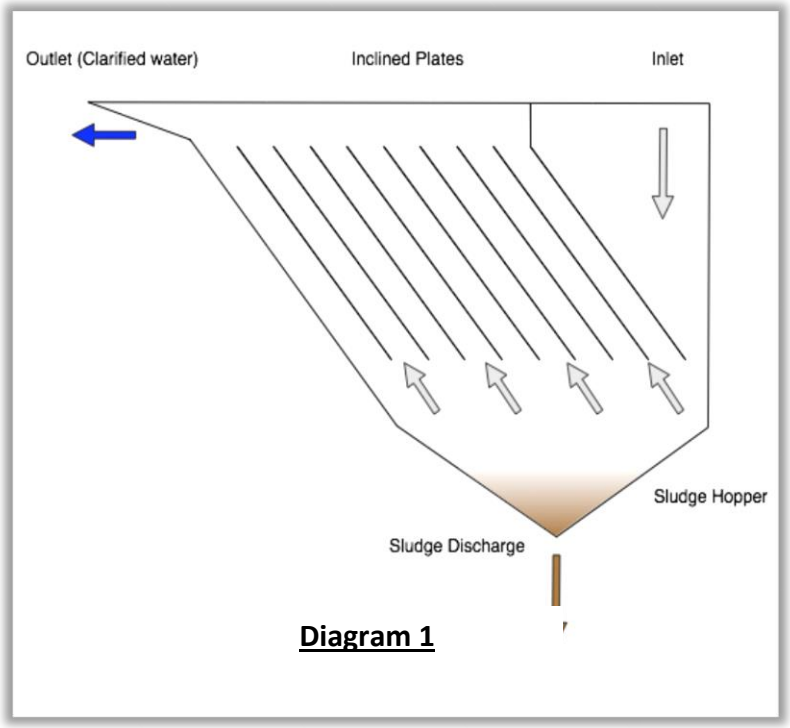


Diagram 1

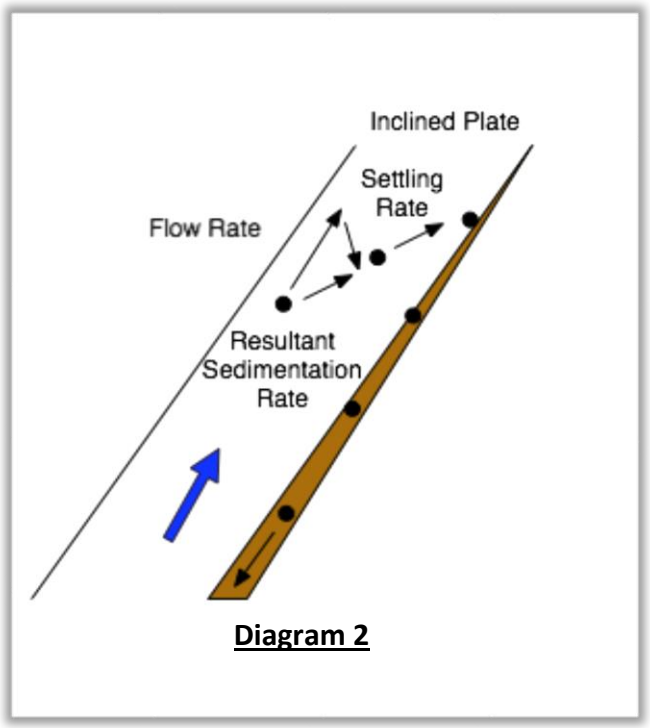


Diagram 2

Diagram 1. Water enters through a channel in the top of the clarifier and flows down and then up between the lamella plates or through the lamella tubes. Clarified water exits over a weir or launder.

Diagram 2. Water moves slowly up through the lamella plates or tubes, and the flocculated particles (sediment) slowly settles onto the plates or tubes. When the mass of the flocculated particles overcomes plate or tube friction it settles under the effect of gravity to the bottom of the sludge hopper where it is removed on a regular basis.

Appendix B – Rankings Following Tender Evaluation

Tenderer	Relevant Experience (15%)	Track Record (15%)	Management Skills (10%)	Methodology (10%)	Price (50%)	Overall Score	Ranking
Service Engineers	12	12	8	8	48	89	**1 (Preferred Tender)**
Tenderer A	13	12	8	8	40	81	2
Tenderer B	11	10	7	7	40	74	3
Tenderer D	13	12	8	9	24	66	4
Tenderer C	11	12	8	6	25	62	5
Tenderer E	11	10	8	9	20	57	6
Tenderer F	10	12	7	6	15	49	7