

Tailings Thickening Plant modifications



Tbilisi 2023

1. BACKGROUND AND REFERENCES INFORMATION

This Technical Requirements Specification based in:

- The result of the engineering done by Fimpec for the project referenced P1364 “RMG Tailings Thickener Detail Engineering” and subsequent approved contract variation orders;
- Some changes that RMG require to be implemented on the already delivered detail engineering.

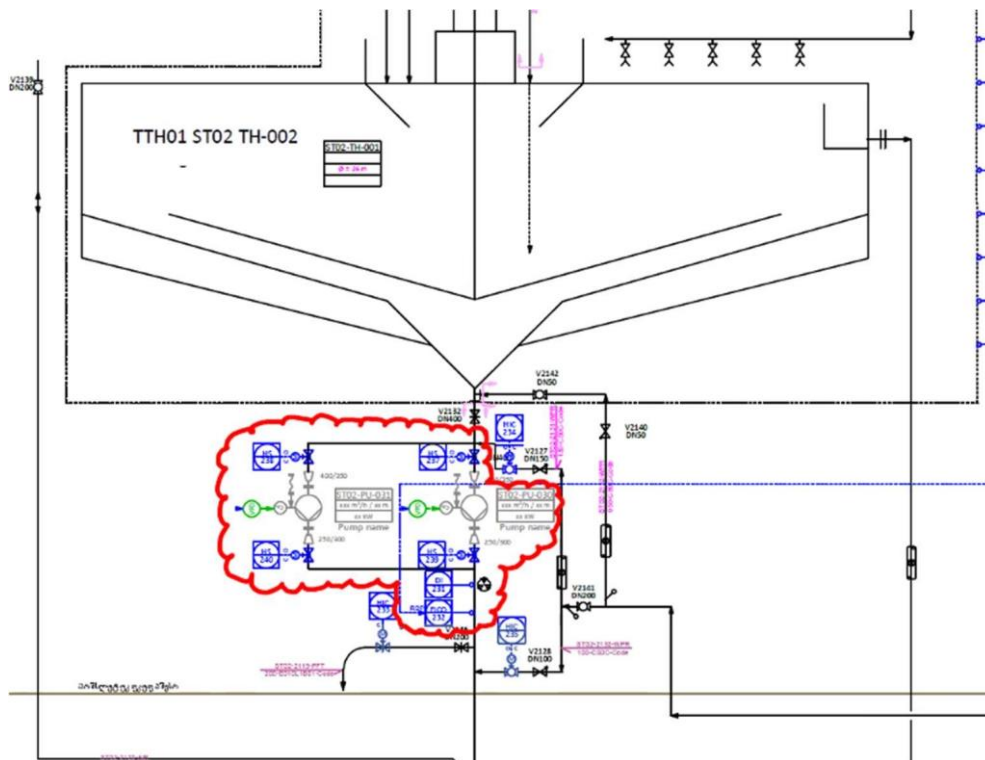
A description of the changes is included next.

2. SCOPE OF WORK

The scope of work of this offer presented in this chapter.

2.1 Underflow pumps

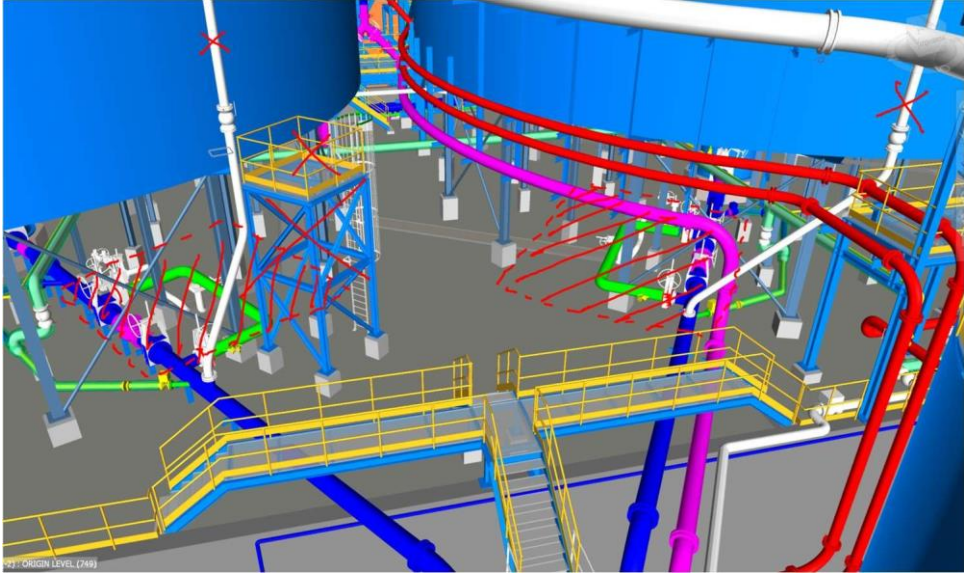
Thickeners underflow changed from gravity flow controlled by regulation valve to pumped, for both thickeners.



Equipment and piping layout to be reconfigured in the area under the thickeners, with some updates required for civil work and electrical (new cable trays to the pumps).

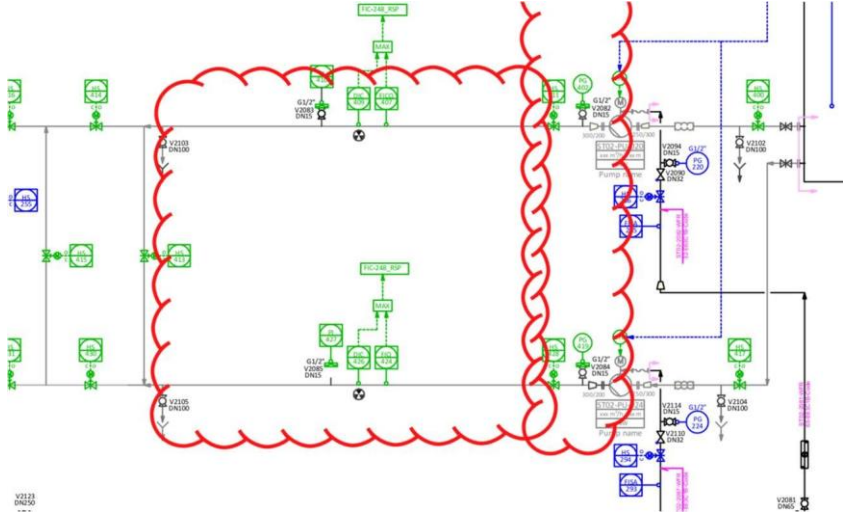
The configuration with two pumps in bypass need to be checked by process. This proposal is considering a probable second outlet from the thickener for the second pump.

Pipe vents and it's access are probably not required as they are related to the underflow by gravity.

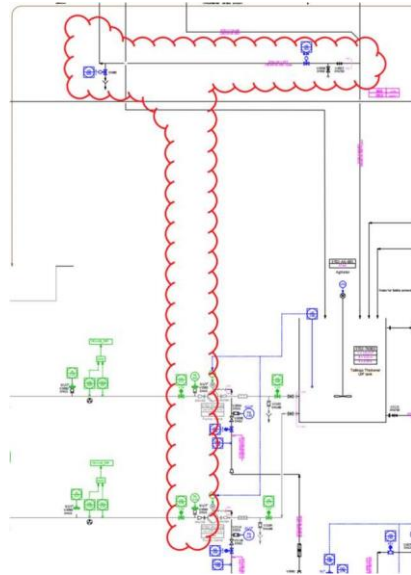


2.2 Tailings pumps train reduction

This change affects to the tailings pumps building. As tailings are no longer delivered to a tailings storage facility (TSF) but to a much closer Filtering Plant (about 300 m), there is no need to install 4 pumps in series for each tailing pumping line. The number of pumps is reduced to one, for each line, according with next diagram. PU-021 to 023 and 025 to 027 are removed.



The bed mass formation is done now by the new UF pumps. Same as shown below applies to both thickeners.

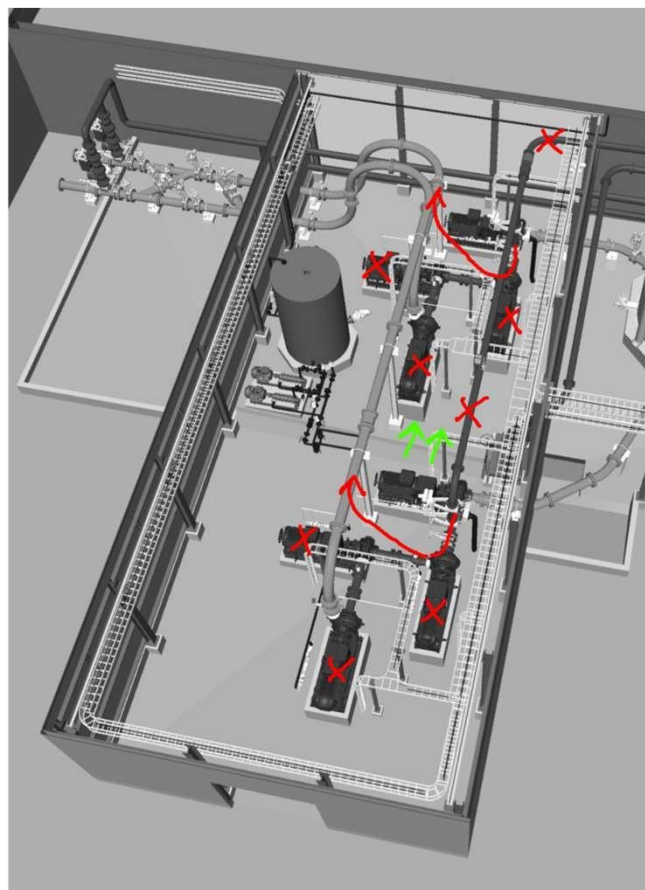


Piping must be modified according with new PID.

Layout of civil work and the building will remain as it is already designed.

Pipes from underflow tank may require modification due to pump relocation.

Gland seal water system to be modified as well. Gland seal water tank capacity may be reduced too.



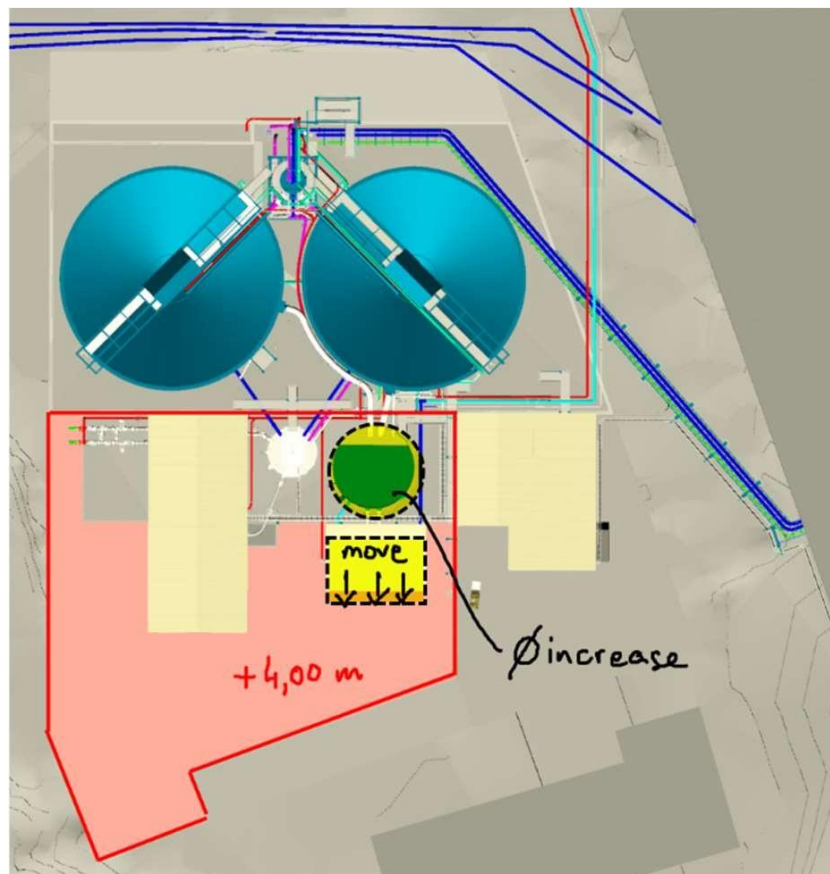
2.3 Tanks area height increase

Rising approximately 4 meters of tank support level to equal MCC level.

Overflow tank diameter was increased to keep the position and allow overflow by gravity as it was. The new dimensions of the tank may affect to the water pump building position.

Tank access platform update is required too.

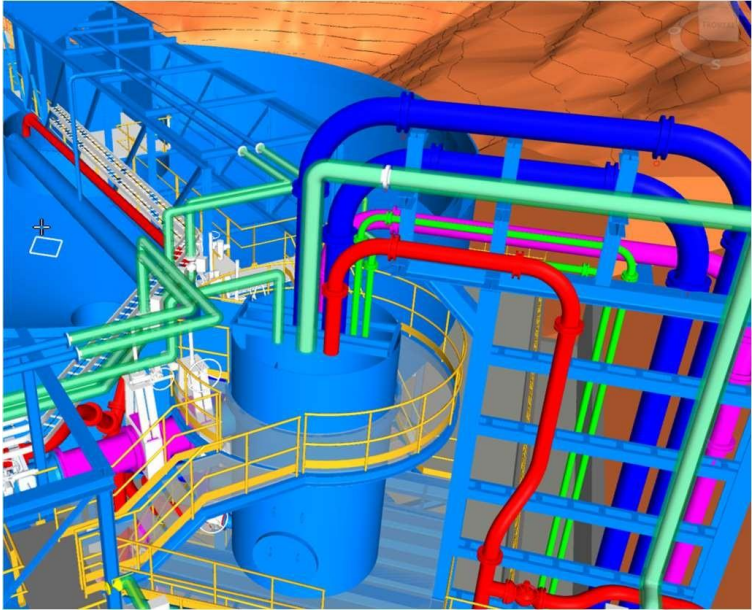
Civil works, piping, steel structure (stairs structure and buildings, only 3D model) and cable trays to be modified accordingly.



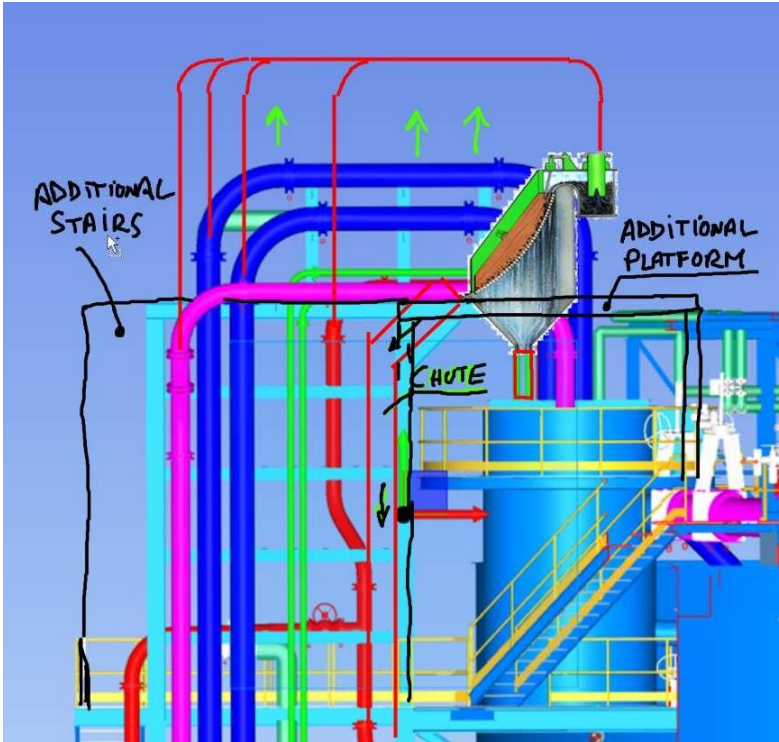
2.4 Tailings screening before feed tank

Screening equipment is required before the feed tank to avoid coarse material to enter into the tailings thickening plant and later on to the filtering plant, affecting to the filter press equipment. This screening equipment must be defined (dimension and position) at least roughly, in order to evaluate the workload required for the changes to be implemented on top of the feed tank platform.

Equipment layout, piping and steel structure to be affect in this area.



As at the time of development of this Technical Requirements Specification, the size and specification of the screening equipment is not known, for the purpose of the workload estimation for this proposal, a sieve bend equipment is considered installed on top of the feed tank, modifying the supporting and access structure accordingly. The diversion of coarse material will be done by a steel chute to a steel bin in the thickener support level(ground), from where it will be periodically retired by forklift. An approximate solution is shown in the next sketch:



2.5 Engineering documentation updates

The following documents to be updated in order to fulfil the new plant requirements:

Document code	Title
P1364-HL-001-0	DOCUMENT CONTROL LIST
P1364-PR-002-12	Equipment List
P1364-PR-006-0	Equipment Sizing - Pumps
P1364-PR-009-13	Pipe Sizing & instructions for detail work (Pipe list)
P1364-PR-010-2	Emergency shut down system design instructions
P1364-PR-011-6	PFDs
P1364-PR-013-4	System Functional Description
P1364-PR-014-M18	Process P&ID
P1364-PR-015-1	Process control Philosophy
P1364-PR-016a-H	Control Valve List
P1364-PR-016b-H	On/Off Valve List
P1364-PR-016c-12	Manual Valve List
P1364-PR-016d-H	Self acting Pressure Regulators
P1364-EA-003-F	Electric Equipment list
P1364-EA-004a-I	Measuring Point List
P1364-EA-004b-H	Pressure Gauges
P1364-EA-007-4	Specification of Process Control System (PCS)
P1364-PC-001-0	Bidding documents Package 1: Pumps
P1364-PC-006-2	Bidding documents Package 6: Instruments

3. REQUIRED INFORMATION

A scope of work include the previous engineering and a base design of the changes which will include:

- Civil work As-Built information (2D drawings of plan view and sections and topography);
- Updated PID.

4. ACTIVITIES

Process engineering and documentation update to be the basis for the BIM 3D.

The design to be made in a BIM 3D model from which all drawings and MTO to be obtained.

The scope of work to be developed, through the following activities. Same level of detail as defined in the reference offer and previous works to be applied:

ACTIVITY 1: Process updates

Process engineering and documents mentioned in chapter 2.5 to be updated accordingly. New underflow pumps to be dimensioned, gland seal water pumps to be re-calculated as well as trash screen to be dimensioned including the collecting trash chute. P&ID to be updated and all other relevant process documentation to be revised.

ACTIVITY 2: Integral and piping preliminary design and basic engineering.

Preliminary 3D design of general arrangement and piping. This design to be subjected to Client approval to go further to next activities.

ACTIVITY 3: Integral and piping detail engineering.

Once preliminary layout and GA drawings are approved, then the design to be developed into detail including:

- 1) Main equipment integration in the 3D model according with information from the selected vendors.
- 2) Secondary equipment and packages (pumps, inline equipment, flocculant preparation,) according with information from selected vendors.
- 3) Structure calculation and drawings for construction (Piperack, access walkways, etc, if they are required).
- 4) Piping design according to piping specifications and ISO generation.

- 5) Revision of civil works, foundations, banded area (concrete elements envelope). This design to be subjected to Client approval to go further to next activities.

Also this activity to be include next items:

- Equipment, valves, lines and instrumentation lists (weekly updated);
- GA drawings (weekly updated) from 3D model including pumps;
- Piping routing drawings;
- Pipe supports design (standard, special and structural);
- Structures and piping support base plate reactions report/drawings for civil works design;
- Structures Material Take Off;
- Pipelines Material Take Off.

ACTIVITIES 4: Electrical preliminary design, basic engineering and detail engineering.

- Design criteria.
- Electrical loads list.
- Single line diagrams.
- Cable tray design.
- Electrical room GA.
- Drawings of electrical installation (cable trays, conduit).
- Electrical calculation for cable sizing, power system, load flow and short circuit, grounding and lightning protection.
- Electrical cable schedule.
- Electrical Material Take Off.

5. EXCLUSIONS

- Design of civil works, concrete structure or foundations.
- Erection / heavy lifting maneuvers design and calculations.
- In general all that is not included in the scope of work.

The engineering level of detail to be enough to update consolidated bill of quantities and obtain piping and supporting structure supply and fabrication budgets valid for construction.