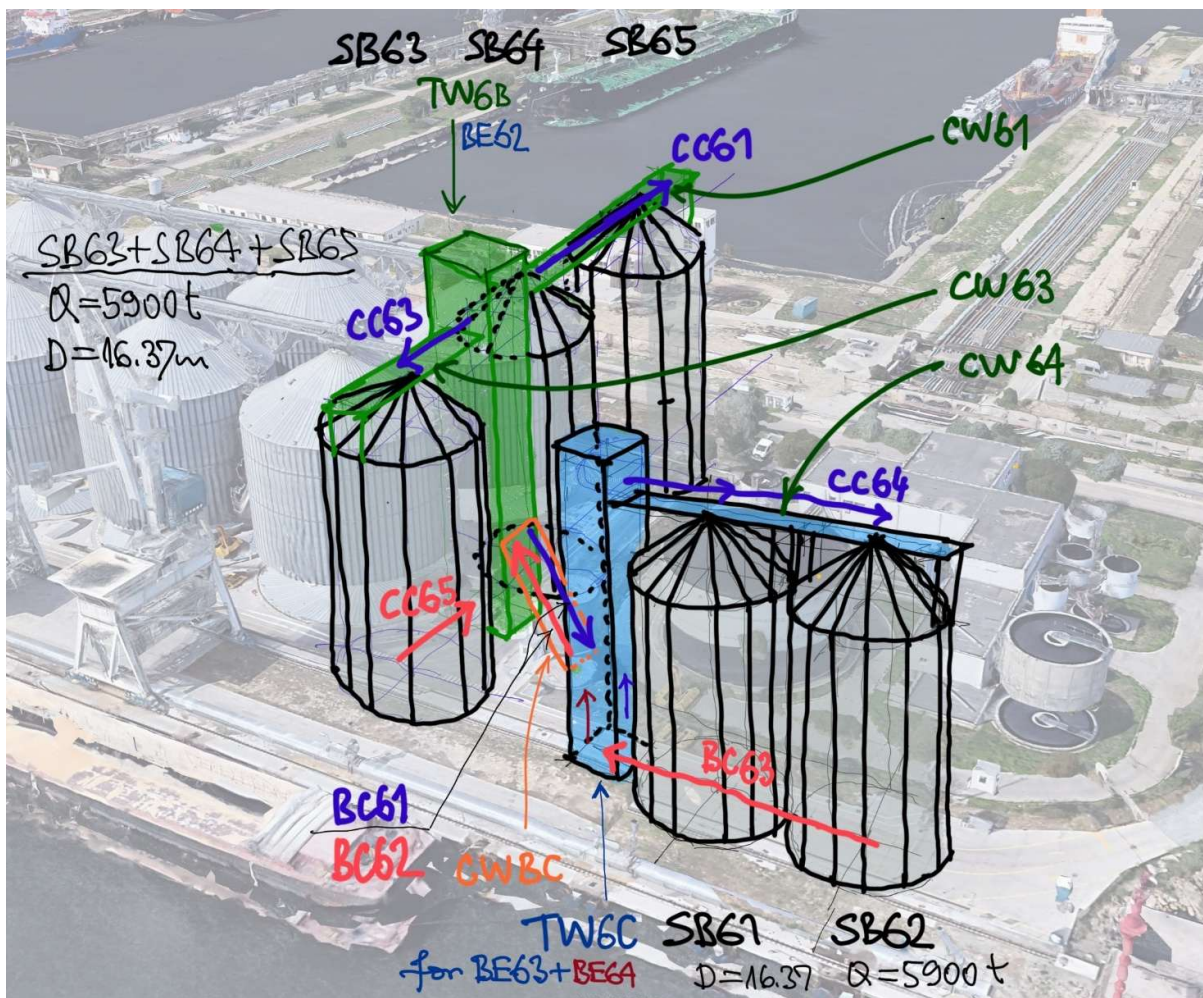


COMVEX Grain Terminal

STORAGE CAPACITY EXPANSION EAST AREA TECHNOLOGICAL DESCRIPTION



May 22, 2025

TECHNOLOGICAL DESCRIPTION and EQUIPMENT LIST

This description is based on the following two drawings:

1. General Layout: [2025-05-22 EAST Expansion – General Layout.pdf](#); and
2. Flow Chart: [2025-05-22 EAST Expansion – Flow Chart.pdf](#)

BASIC INFORMATION

In the east area of COMVEX Grain Terminal (“CGT”) will be added five new silo bins with total storage capacity of 28,000 mt (D = 16.37 m).

Practically, almost all available area on the east side of the existent Grain Terminal is used for the subject East Expansion Project which resulted in 5 new silo bins.

General Layout is shown in the drawing [2025-05-22 EAST Expansion – General Layout.pdf](#).

Anchorage levels of all silo bins are +3.95m.

Anchorage levels of towers are:

- +3.50m for TW6B;
- +3.95m for TW6C; and
- +3.00m for TWCWBC.

Remark: anchorage level means bottom level of anchoring plate of steel structure. Below anchoring plate will be a gap of about 70-80 mm for pouring small fraction leveling concrete. This gap will be defined in documents drafted for civil works.

Storage capacity of silo bins is based on wheat (density 780 kg/m³ and 6% compaction).

Reference Project Level (“Zero Level” = ±0.00m) is the level of Black Sea.

All dimensions are in metric system. Consequently, all quantities are in metric tons (abbreviation “t” is used for “metric ton”).

LOADING NEW SILO BINS

Basically, from operational point of view, to 8 existent flat bottom silo bins SB01÷SB04 and SB05÷SB08 [or A08÷A11 and B08÷B11 (construction codes)] in the east storage area will be added five new flat bottom silo bins.

Silo bin codes:

Construction	SB01	SB02	SB03	SB04	SB05	SB06	SB07	SB08
Operation	A08	A09	A10	A11	B08	B09	B10	B11

Five new silo bins SB61÷SB65 can be loaded from existent HI ROLLER belt conveyor BC06 (handling capacity rate 600 t/h; HI LIFE model) which is placed above 4 existent flat bottom silo bins SB05, SB06, SB07 and SB08 [or B08, B09, B10 and B11 (construction codes)].

Existent belt conveyors BC06 will require the following modifications:

1. Conveyor extension for about 15 m towards east (shifting drive with end outlet towards west)
2. Adding new intermediate outlet [one outlet/tripper over SB08/B11 (@BC06)]
3. Replacement existent motor of 55 kW with new one of 75 kW

From the last outlet (new outlet at shifted drive head), belt conveyors BC06 will feed new bucket elevator BE62 (600 mt/hour), which will be installed in new tower TW6B. Its boot sections with inlet is placed at required height (at the level of about +17m) to provide grain transfer from outlet of BC06 to inlet of new BE62.

New bucket elevator BE62 in tower TW6B lifts grain to feed the following equipment:

- CC61 (to feed silo bins SB64 and SB65)
- CC63 (to feed silo bin SB63)

The height of tower TW6B is about 51 m (between levels +3.50m and +54.40m).

Existent AGI/FRAME tower on the east side of existent silo bin SB08/B11 (footprint W x L = 3.00 m x 3.00 m), will be dismantled and replaced with the new tower TW6B, which will also support existent catwalks for extended BC06 over silo bin SB08/B11.

Two silo bin groups (SB63+SB64+SB65 and SB61+SB62) will be connected by two belt (or chain) conveyors:

- BC61: 600 t/h for delivery grain from group SB63+SB64+SB65 (from tower TW6B) to BE63, i.e. to the group SB61+SB62; and
- BC62: 600 t/h for delivery grain from group SB61+SB62 (via BC63 and BE64) to the existent belt conveyor BC03 (HI ROLLER; 1500 t/h; HI LIFE model).

Remark #1: existent belt conveyor BC03 will be extended for 6.80 m (and existent belt conveyor BC04 as well).

Remark #2: instead of belt conveyors BC01, BC02 and BC03 can be implemented chain conveyors of 600 t/h.

BC61 and BC62 are placed side by side on the CWCWBC catwalk. This catwalk connects towers TW6B and TW6C. It has one intermediate support tower TWCWBC.

On the west side of silo bin SB61 is placed tower TW6C. This tower supports:

1. Equipment:
 - a) Bucket elevator BE63 (600 t/h; receiving grain from BC61 and feeding chain conveyor CC64 for feeding silo bins SB61+SB62).

- b) Bucket elevator BE64 [600 t/h; receives grain from BC63 (i.e. from silo bins SB61+SB62) and delivers to BC62].
- 2. Steel structures:
 - c) Catwalk CWCC64 with CC64 over silo bins SB61+SB62.
 - d) Catwalk CWBC with BC61 and BC62 between towers TW6B and TW6C.

DELIVERY FROM NEW SILO BINS

All 5 silo bins will be equipped with hydraulic sweep augers with capacity rates 250 mt/hour.

Each silo bin will have 4 outlets:

- a) One central for capacity rate of 600 mt/hour.
Central outlet will be equipped with slide gate with proportional opening for controlling grain outflow.
- b) Two auxiliary outlets with dimensions of 300 mm x 300 mm.
- c) One auxiliary outlet with dimensions of 450 mm x 450 mm.
This auxiliary outlet is placed next to silo bin wall.

Remark: each auxiliary outlet will be equipped with slide gate with non-proportional opening (only open/closed positions).

From 5 new silo bins grain will be reclaimed onto existent belt conveyors BC03 and BC04 (both HI ROLLER HI LIFE MODEL; 1500 t/h; must be extended for 6.80 m) towards existent bucket elevators BE02 and BE03 as follows:

- a) From silo bins SB64 and SB65 grain will be delivered to extended BC04 via chain conveyors CC66 and CC67 (600 t/h);
- b) From silo bin SB63 grain will be delivered to extended BC03 (1500 t/h) via chain conveyor CC65 (600 t/h);
and
- c) From silo bins SB61 and SB62 grain will be delivered to extended BC03 (1500 t/h) via BC63, BE64 and BC62
all 3 conveyors are of 600 t/h).

Existent reclaiming belt conveyors BC03 and BC04 will be extended for 6.80 m to provide new inlets for the following flows:

- From CC65 and BC62 to BC03; and
- From CC66 and CC67 to BC04.

MODIFICATIONS OF EXISTENT EQUIPMENT

Three existent HI ROLLER belt conveyors will suffer the following modifications:

1. Belt conveyor BC06

Location for modification: over flat bottom silo bins:

- BC06: over silo bins SB05÷SB08 (B08÷B11)

Modifications:

- a) Extension about 15 m; and
- b) Adding one intermediate outlet (tripper) to BC06 to feed SB08.
- c) Replacement existent motor of 55 kW with new one of 75 kW

2. Belt conveyors BC03 and BC04

Location for modification: tail section (the most eastern area of both belt conveyor).

Modification:

- a) Extension tail section towards east for about 6.80 m; and
- b) Adding new inlets for feeding 600 mt/hour:
 - Two inlets to BC03 (from CC65 and from BC62); and
 - One joint inlet to BC04 (from CC66 and CC67)

Remark: existent motors have capacity to support extension of 6.80 m.

STEEL STRUCTURES

East Expansion Project comprises the following steel structures:

1. Tower TW6B

This tower supports:

- Bucket elevator BE62
- Catwalk over silo bin SB08 with belt conveyor BC06 which will be extended for about 15 m
- Catwalks over new silo bins SB63 (catwalk CW63) and SB64+SB65 (catwalk CW61)

2. Tower TW6C

This tower supports:

- Bucket elevators BE63 and BE64
- Catwalk over silo bin SB61 and SB62 with chain conveyor CC64
- Catwalks CWBC with belt conveyors BC61 and BC62

3. Catwalk CWBC

This catwalk supports:

- Belt conveyors BC61 and BC62

4. Tower TWCWBC

This tower supports:

- Catwalk CWBC

5. Catwalks over all silo bins to support feeding chain conveyors

Those 4 catwalks support the following chain conveyors:

- Catwalk CW61 supports chain conveyor CC61 (over silo bins SB64+SB65);
- Catwalk CW63 supports chain conveyor CC63 (over silo bin SB63); and
- Catwalk CW64 supports chain conveyor CC64 (over SB61 and SB62).

SUMMARY

HANDLING CAPACITY RATES

Brief summary on handling capacity rates:

- a) Silo feeding system is 600 mt/hour (from existent belt conveyor BC06 to bucket elevator BE62 and further);
- b) Silo reclaiming system is 600 mt/hour (from silo bins central outlets to existent belt conveyor BC03 and BC04); and
- c) Sweep augers are 250 mt/hour each.

ATEX REQUIREMENTS

- a) Tunnels under silo bins and elevator pit for BE64 are ATEX22 areas
- b) Interiors of silo bins are ATEX 21 areas

SPOUTING

All spouting will have minimum slope of 40 degrees. At least at each 6 m vertical distance will be installed drop flow retarder. Spouting will be lined by polyurethane liners 6 mm thickness with integrated stretched metal (vertical parts to be fully lined, while inclined parts to be lined at bottom and 2/3 of lateral walls). Spouting covers will be detachable for easy inspection and maintenance access.

Spouting cross sections:

- square 500x500mm for 600 t/h; and
- square 800x800mm for 1500 t/h.

LIST OF HANDLING EQUIPMENT

Equip ID	Dimension	Capacity	Description
BE62	H=35m	600 mt/h	Bucket elevator between SB64 and SB63
BE63	H=48m	600 mt/h	Bucket elevator to SB61+SB62
BE64	H=27m	600 mt/h	Bucket elevator from SB61+SB62
BC61	L=45m	600 mt/h	Belt conveyor to SB61+SB62
BC62	L=47m	600 mt/h	Belt conveyor from SB61+SB62
BC63	L=33m	600 mt/h	Belt conveyor under SB61+SB62
CC61	L=45m	600 mt/h	Chain conveyor over silo bins SB64 and SB65
CC63	L=15m	600 mt/h	Chain conveyor over silo bin SB63
CC64	L=33m	600 mt/h	Chain conveyor over silo bins SB61+SB62
CC65	L=18m	600 mt/h	Chain conveyor under SB63
CC66	L=19m	1500 mt/h	Chain conveyor under SB64
CC67	L=18m	1500 mt/h	Chain conveyor under SB65
SA61	D=16.37m	250 mt/h	Sweep auger for SB61
SA62	D=16.37m	250 mt/h	Sweep auger for SB62
SA63	D=16.37m	250 mt/h	Sweep auger for SB63
SA64	D=16.37m	250 mt/h	Sweep auger for SB64
SA65	D=16.37m	250 mt/h	Sweep auger for SB65
VA62		600 mt/h	3-way valve (flow diverter from BE62)
VA64		600 mt/h	2-way valve (flow diverter from BE64)
BC06	Extended 15 m	600 mt/h	Existent feeding belt conveyor above silo bins - CL "B"
BC03	Extended 6.80 m	1500 mt/h	Existent reclaiming belt conveyor - CL "B"
BC04	Extended 6.80 m	1500 mt/h	Existent reclaiming belt conveyor - CL "A"

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