Wacker Chemicals, Holla

Wacker Holla Expansion

Mass Handling Plan – Groundwork

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1 Preliminary mass handling assessment

1.1 Mass handling plan

The following applies to soil masses that are to be transported during the project and is an early-phase estimation (pre-basic).

Mass handling plans will be prepared in the next design phase and will have a description of implementation that follows plans and requirements approved by environmental authorities and the municipality. The basis for mass management will be, among other things, to prepare an overall action plan for contaminated land, an application for dredging and infilling at sea, as well as a closure plan for landfill.

The area specification and implementation method described here can be changed.

1.2 Classification of soil masses and implementation

Area	Condition class	Implementation
On the seabed *Refers to the environmental report: NO-52203733-RIM-01*	Sediments between classes 1-4	When developing a quay, there is a risk of spreading environmental contaminants and particles to areas that have a lower degree of pollution. Environmental risk depends on the design of the quay and the method of implementation. This risk is evaluated in the application to the state administrator for permission to perform the marine construction activity. If excess dredging masses are created, they are handled as industrial waste and must be delivered to approved reception facilities.
On land *Refers to the environmental memo: 52208592_Memo_Wacker_Environmantal_Memo*	Class 1 – Excellent	Can be temporarily stored and reused internally and externally, as long as Miljødirektoratets fact sheet M1243 is followed [1]. According to M1243, class 1 masses must be delivered to an approved reception facility for clean masses.
	Class 2-3 – Good to moderate	It is assumed that the soil masses can be temporarily stored and reused inside the industrial area, **to be clarified.** Reference 1. Alternative: which has not been calculated for. If the soil masses cannot be reused internally, they must be delivered to approved reception facilities.
	Class 4-5 – Bad to very bad	Soil masses in class 4-5 can be left in place if it is documented that the risk for spreading and health is acceptable. If the risk for spreading and health is either deemed unacceptable with regard to a risk assessment, or if there is a soil mass surplus, then the soil masses must be delivered to approved reception facilities.

Table 1: Classification of masses.

Supplementary ground investigations will be carried out in connection with the preparation of an overall environmental action plan.

1.3 Areas with soil mass withdrawals

Picture mark out most of the areas with groundwork. This is connected to one specific layout alternative. The read line mark the limit between Industrial area and Lagoon area.

Lagune masses:

This work must follow the approved closure plan for the landfill. It is assumed in pre-basic engineering that landfill material in the area must be removed down to the original sandy subsoil (assumed down to elevation +1).

Lagune topsoil <1m: 95% condition class 2-3, and 5% in condition class 4-5.

Lagune subsoil >1m: 100% assumed condition class 2-3.

Industrial masses:

Inside the current industrial area. This work must follow the approved overall environmental action plan. It is assumed in pre-basic engineering that industrial masses in the area must be removed to down under foundation for light buildings, and entirely down to the original sandy subsoil (assumed down to elevation +1) for heavy buildings.

Industrial topsoil <1m: 95% condition class 2-3 and 5% in condition class 4-5.

Industrial subsoil >1m: 50% condition class 1, 45% condition class 2-3 and 5% in condition class 4-5.

Additional risk element:

Due to uncertainty of the content of contamination, there can be higher amount of masses in condition class 4-5, the risk for this is estimated to be 45% in addition for topsoil and 15% in subsoil.

Surplus masses:

If base case should be valid there will be surplus masses that we could use in industry area, but which Holla site do not have space for. It’s done a rough estimate on which masses that we can put under light buildings and as outside area adjustments.

Surplus masses are divided between masses class 1 and class 2-3 approx. 50% each.

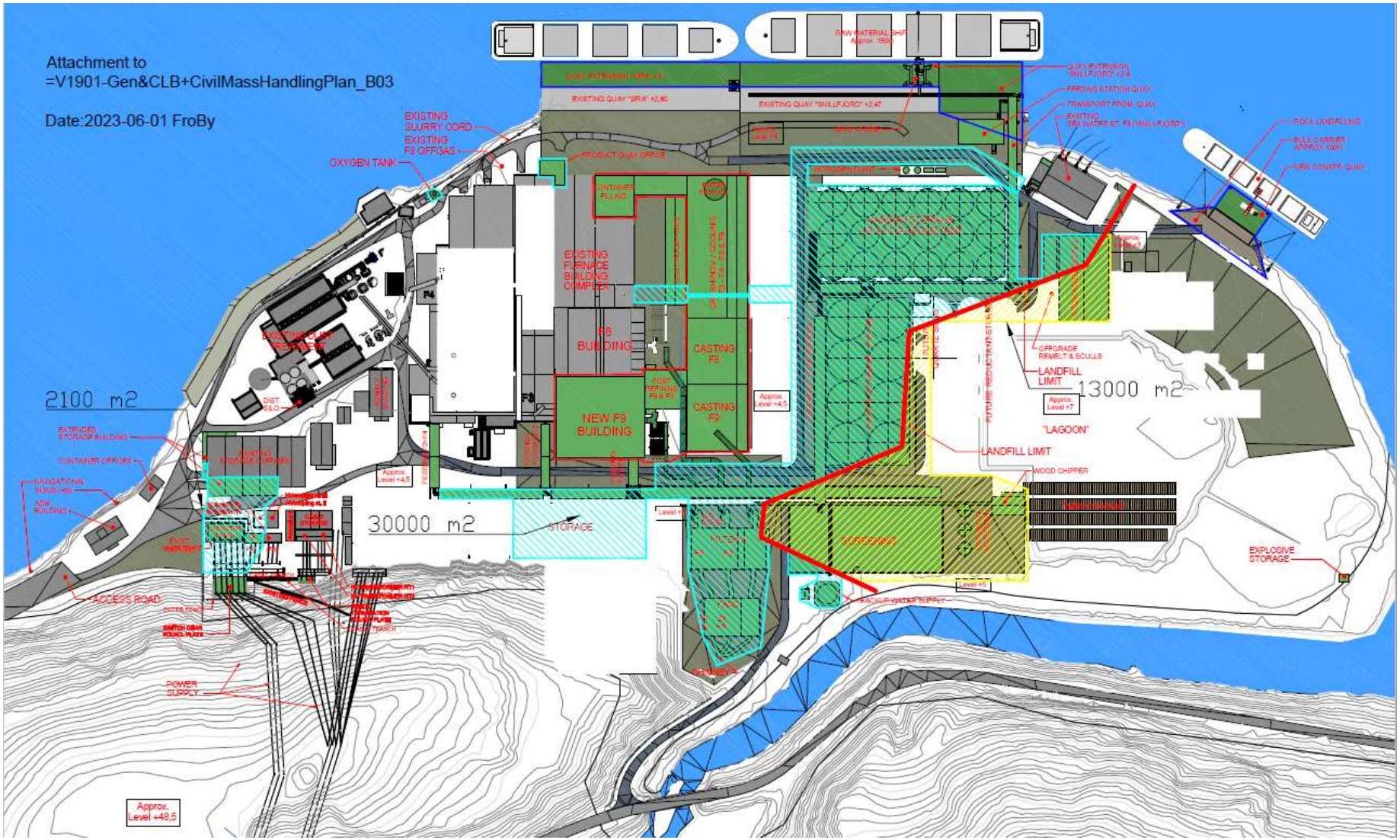

Figure 1: A clip from attachment 1. Areas with soil mass withdrawals, represented by the light blue markings.

1.4 Volume estimates

This assessment of mass estimates are made with assumed distribution in the various condition classes

Wacker Holla Expansion - Pre Basic Estimation of mass handling volumes

	Date 2023-05-05	file:	=V1901-Gen&CLB+CivilMassHandlingPlan_J04				Class 1 - Rock masses (different grade)		Class 1 (Sand, soil, and silt)		Class 2-3 (Sand and silt)		Class 2-3 (Deposited masses)		Class 4 -5	
	Reviced 2023-06-01	Created:	FroBy	Checked:	MaBor		New masses (incoming)		Temporary stored on site (Surplus outgoing)		Temporary stored on site (Surplus outgoing)		Transport to closeup filling		Direct to transport, (Outgoing)	
		Area	Average elevation	Total mass handling on site [m3]	Incoming Holla [m3]	Outgoing Holla [m3]	Share of total	Amount [m3]	Share of total	Amount [m3]	Share of total	Amount [m3]	Share of total	Amount [m3]	Share of total	Amount [m3]
Quay area	Rehab Snillfjord - New erosion rock layer	-	-	600			100 %	600								
	Extension Snillfjord - New erosion rock layer	-	-	2 150			100 %	2 150								
	Extension Snillfjord - Dredging	-	-	684											100 %	684
	Extension Snillfjord - Sea filling, rock layer	-	-	7 650			100 %	7 650								
	Expansion Snillfjord - Dredging	-	-	1 041											100 %	1 041
	Expansion Snillfjord - Excavation building pit	-	-	600							95 %	570			5 %	30
	Expansion Snillfjord - Backfilling building pit (90% of building pit. 10% concrete structure)	-	-	540			20 %	108			-80 %	-432				
	Rehab Øra - New erosion rock layer	-	-	600			100 %	600								
	Expansion Øra - New erosion rock layer	-	-	1 540			100 %	1 540								
	Expansion Øra - Dredging	-	-	1 080											100 %	1 080
	Construction Quay - Dredging	-	-	520											100 %	520
	Construction Quay - Excavation building pit	-	-	510							95 %	485			5 %	26
	Construction Quay - New erosion rock layer	-	-	1 475			100 %	1 475								
	Construction Quay - Backfilling over friction plate	-	-	580			100 %	580								
	Tag 2.5** - Rock masses used from Parking, 20% of **Tag 2.2							-1 678								
SUM Quay				19 570	**13 025**	**4 003**		13 025		0		623		0		3 381
Industrial area (F9 and PTH not included)	Building pit - Excavating Topsoil <1m	30000	1	30 000							95 %	28 500			5 %	1 500
	Building pit - Excavating Subsoil >1m	30000	2	60 000					50 %	30 000	45 %	27 000			5 %	3 000
	Building pit - Backfilling (80% of building pit excavation 30000+60000 m3)			72 000			30 %	21 600	-35 %	-25 200	-35 %	-25 200				
	Kolhaugen - Excavating Soil, sand, and silt for filter 3	-	-	24 300					100 %	24 300						
	***Tag 1.0** - Surplus masses to be used in Lagune building pit*									-20 800		-20 800				
	Furnace 9 area			*18 400*		4 500		13 400								
	PTH area - excavation			*6 600*		4 200										
	PTH area - Backfilling			*9 000*				6 800				-2 300				
SUM Industrial area				220 300	**41 800**	**28 700**		41 800		8 300		7 200		0		4 500
Average top level +6 **Lagune area**	Building pit - Excavating Topsoil <1m	13000	1	13 000									95 %	12 350	5 %	650
	Building pit - Excavating Subsoil >1m	13000	4	52 000									100 %	52 000		
	Building pit - Backfilling (80% of building pit excavation 13000+52000 m3)			52 000			20 %	10 400	-40 %	-20 800	-40 %	-20 800				
	Tag 1.1 - Backfilling surplus masses from Industrial area									20 800	From storage	20 800				
SUM Lagune area				117 000	**10 400**	**650**		10 400		0		0		64 350		650
Power supply area	Surface excavation Kolhaugen	1000	0,5	500					100 %	500						
	Building pit - Blasted rock ***Tag 2.1***	-	-	1 138					100 %	1 138						
	Building pit - Excavation	2100	2	4 200					50 %	2 100	45 %	1 890			5 %	210
	Building pit - Backfilling (50% of building pit excavation)			2 100			50 %	1 050	-25 %	-525	-25 %	-525				
	***Tag 2.1** - Surplus masses (rock) to be used for erosion protection*									-1 138						
SUM Power supply area				500	**1 050**	**3 650**		1 050		2 075		1 365		0		210
Parking area	Surface excavation Kolhaugen	3500	0,5	1 750					100 %	1 750						
	Building pit - Blasted rock ***Tag 2.2***	-	-	8 750					100 %	8 750						
	Building pit - Backfilling	2500	1	2 500			100 %	2 500								
	***Tag 2.2** - Surplus masses (rock) to be used for erosion protection ++*									-8 750						
SUM Parking area				13 000	**2 500**	**1 750**		2 500		1 750		0		0		0
Erosion protection	Filter layer 120/300	-	-	1 888			100 %	1 888								
	Replastre existing Erosion prot.	-	-	450			100 %	450								
	Replaster existing Filter layer	-	-	210			100 %	210								
	Stone layer 0,5 tonne	-	-	5 663			100 %	5 663								
	*Tag 2.3 - Rock masses used from Power Supply. 100% of **Tag 2.1***							-1 138								
	*Tag 2.4 - Rock masses used from Parking. 80% of **Tag 2.2***							-7 072								
SUM Erosion protection				8 210	**0**	**0**		0		0		0		0		0
Construction Road	Construction road - Excavation	-	-	18 000					100 %	18 000						
	Construction road - Backfilling	-	-	14 000					-100 %	-14 000						
	Construction road - Base and sub-base layer	1100	1	1 100			100 %	1 100								
SUM Construction Road				33 100	**1 100**	**4 000**		1 100		4 000		0		0		0
			SUM TOTAL		**69 875**	**42 753**	m3	**69 875**	m3	**16 125**	m3	**9 188**	m3			**8 741**	m3

Table 1: Characterisation of the different masses, by source, transportation and final placement.

Transport of soil masses will either be via boat and/or vehicles.

References

1. Miljødirektoratet: Faktaark - Mellomlagring og sluttdisponering av jord- og steinmasser som ikke er forurenset. 2018

Attachments

Attachment 1: ++OKZ-Gen&CLDA+PbMassHandling page 1

Attachment 2: ++OKZ-Gen&CLDA+PbMassHandling page 2