



Luleå

]≡[MALMPORTEN

Max Bjurström, Project Manager

Agenda - for what to be done in Malmporten

- Background
- Interface
- Dredging works
- Contracts
 1. Test dredging
 2. Environmental dredging
 3. Capital dredging
- Technical aspects



BACKGROUND

INTERFACE

CONTRACTS

TECHNICAL ASPECT



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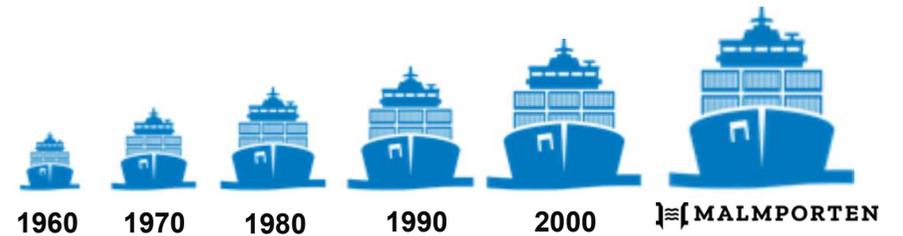
The Port of Luleå – Sweden's largest bulk harbor keeps expanding and the vessel capacity needs to keep up

- TEN-T Core port
- 700 calls per year
- 8-9 million tons year
- 90% of EU iron ore production is related to port of Luleå
- Production and handling is estimated to increase a lot the coming years



Enabling larger vessels to Luleå means -40% fuel consumption, -40% reduced emissions and -40% reduced shipping costs

- More efficient transportation
- Reduces environmental impact
- Improved safety and capacity
- Increased depth to Baltic Sea Max 15 m
- Max cargo 50 000 → 160 000 ton*



	1970-1980	1990	2000	Today	Malporten winter	Malporten summer
Length	109	146	167	195	230	330
Width	15,3	24	24	28	32	55
Depth	6,5	7,8	9,7	10,3	13,4	15,0
DW	6 115	13 774	22 333	44 620	75 000	160 000

* ice-free period

Similar dredging projects has been performed earlier in Luleå - With focus on both dredging the fairways and landfilling's

MUFY, 1973 – 1974

Preparations for Stålverk 80

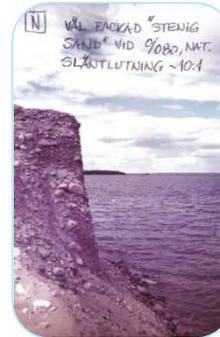
- 1,2 million m³ dredging
- 0,05 million m³ rock blasting

Stålverk 80, 1975 – 1976

- 10 million m³ dredging
- 0,25 million m³ rock blasting
- Hydraulic Filling for land area (~ 180 he)
- 1 200 m quay

Malmhamn, 1994

- 0,45 million m³ dredging
- 250 m quay
- Hydraulic Filling for quay/land area





BACKGROUND

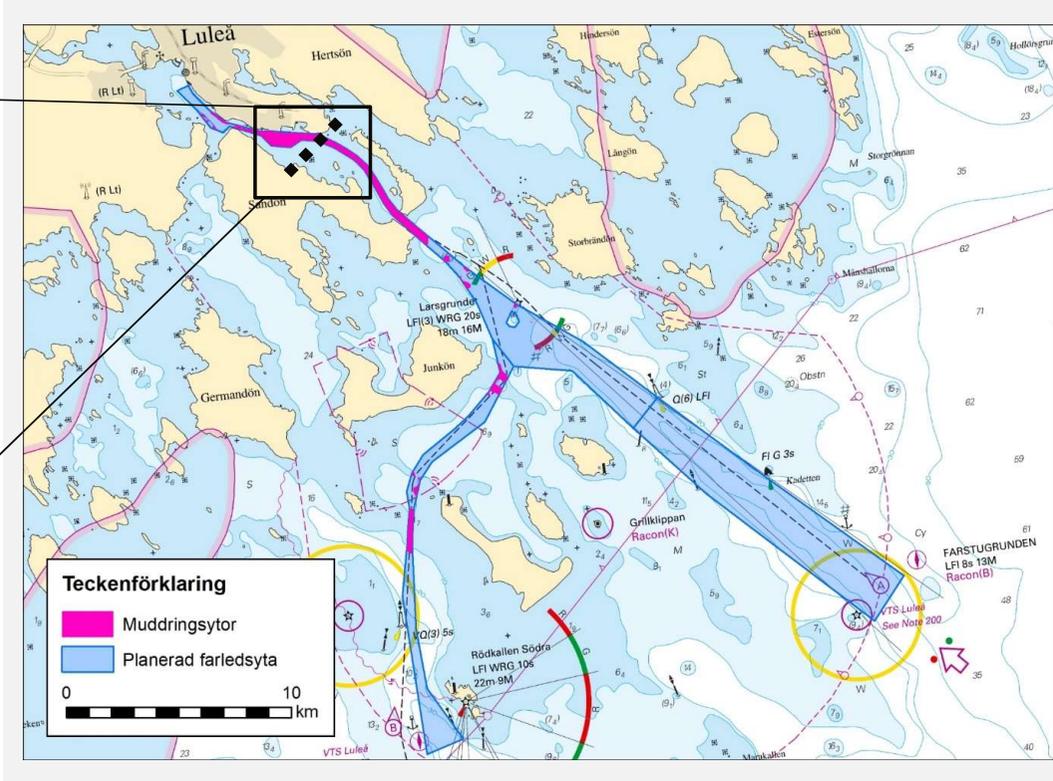
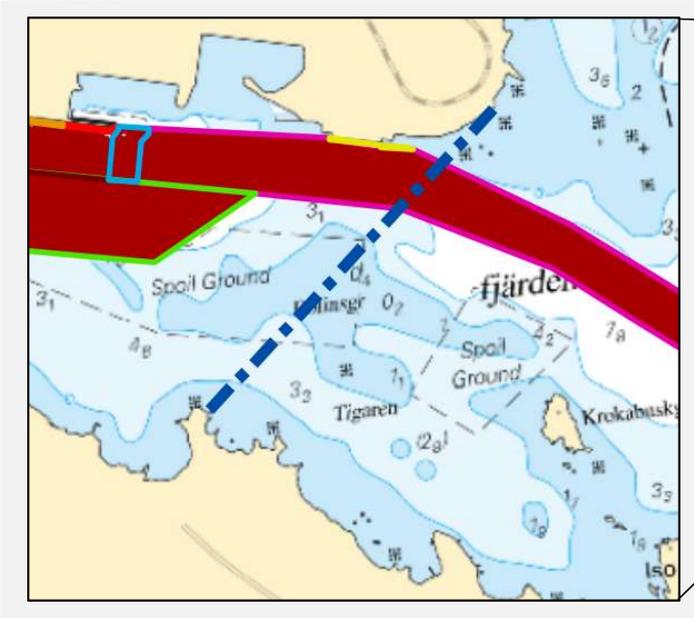
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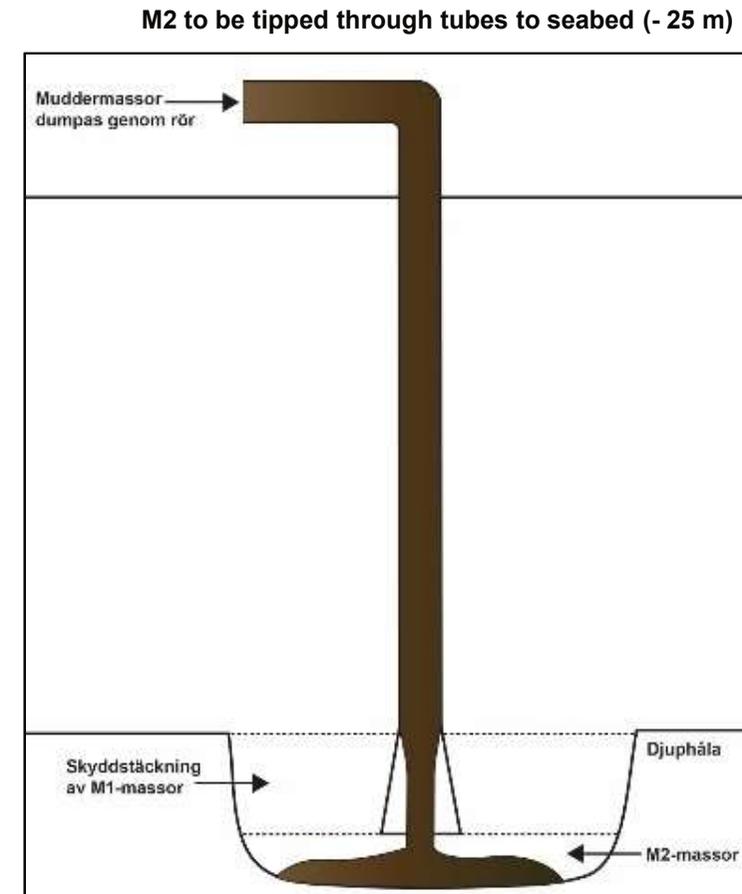
TECHNICAL ASPECT

Malporten is carried out together by SMA & Luleå hamn (Port of Luleå) where each part is responsible for different areas

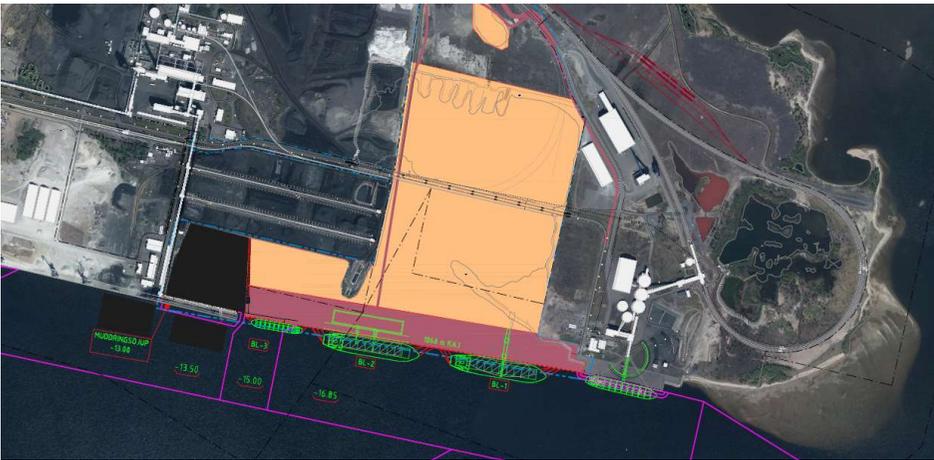


The environmental permit sets the framework, we must also conform to Luleå Ports permit while working in the port area

- M1 non-contaminated material
 1. Dredge by appropriate method, depending of the material
 2. Tipped in 5 areas (-15 m up to -25 m), evenly distributed over the bottom
- M2 lightly contaminated material
 1. Dredge by environmental bucket
 2. Tipped through tubes → SV Vitfågelskär (- 25 m) → 1 m sand as protective cover
- M3 contaminated
 1. Dredge by environmental bucket
 2. Landfill in Skvampen (sealed area)
- Turbidity is limited per category of material (M1, M2, M3)
- Noise restriction (NFS 2004:15) "construction sites"
- Continuity of shipping operations in existing fairways



Luleå Hamn is responsible for the shore side however, parts of the dredged material from the fairway will be used for landfilling in the port

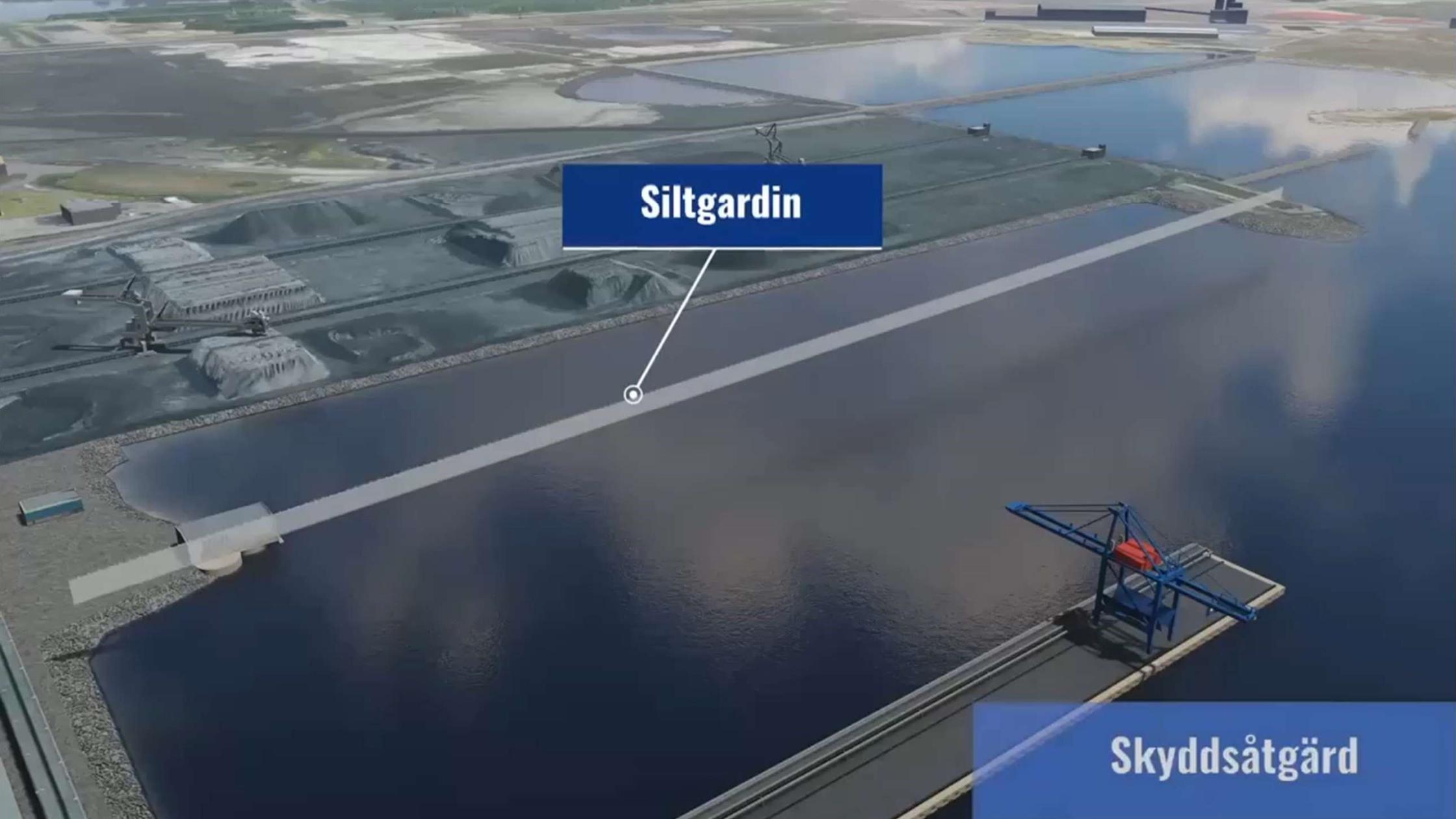


LHAB overall Project

- Quay 1068 m
- Port service
- Cargo handling & storage area
- Land infrastructure
- Railway connection

SMA's responsibilities near the shore (in the port) on behalf of LHAB

- Dredging
- Land- and rock fill



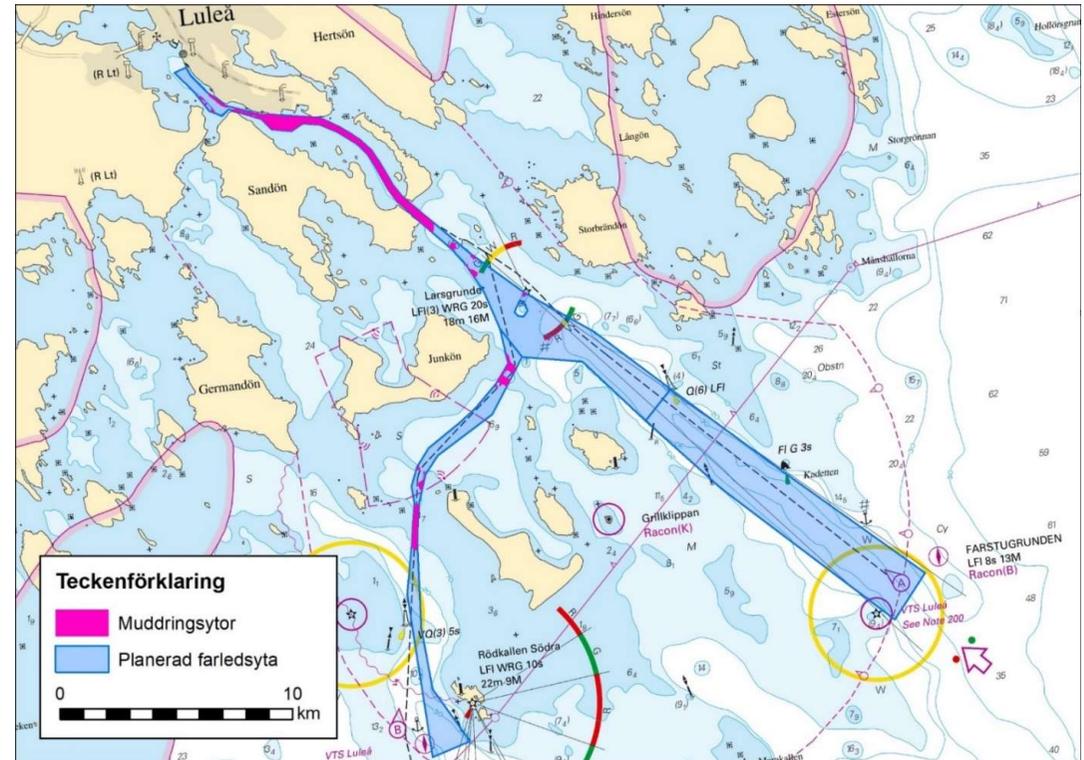
Siltgardin

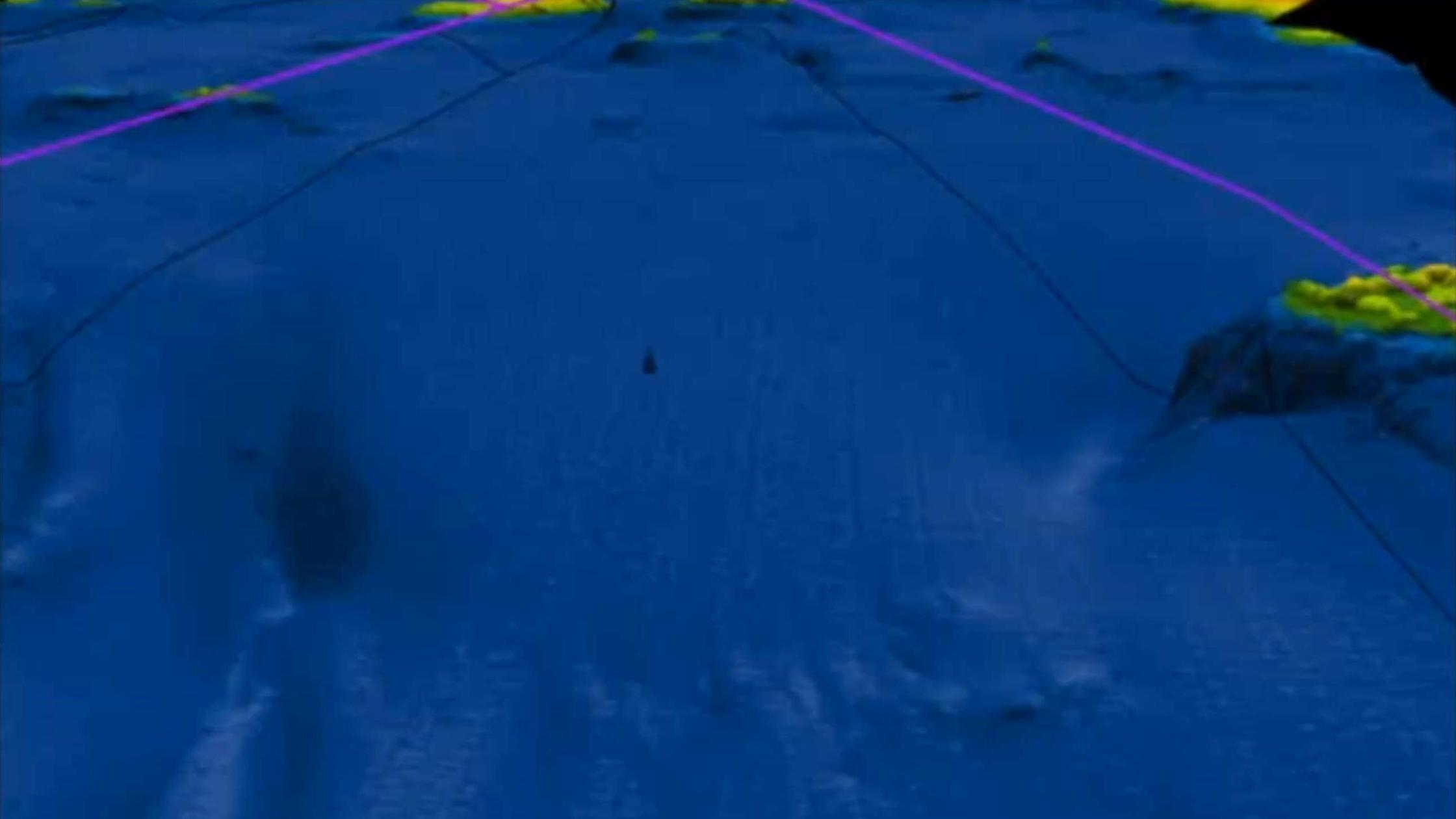
Skyddsåtgärd

SMA is responsible for the dredging of the fairways and the total dredging adds up to about 21 million m³

Approximately 21 million m³ to be dredge down to -17 m

- 20 million m³ silt, clay, sand and till (moraine)
- 1 million m³ rock blasting
- 0,4 million m³ lightly contaminated material (M2)
- 0,2 million m³ contaminated material (M3)
- 1 000 m³ N Kvarken
- Rocks from blasting to be used for LHAB's new quay
- Hydraulic Filling for land area (40 he)
- Erosion protection 50 000 m³ (950 m)
- Navigational aids







BACKGROUND

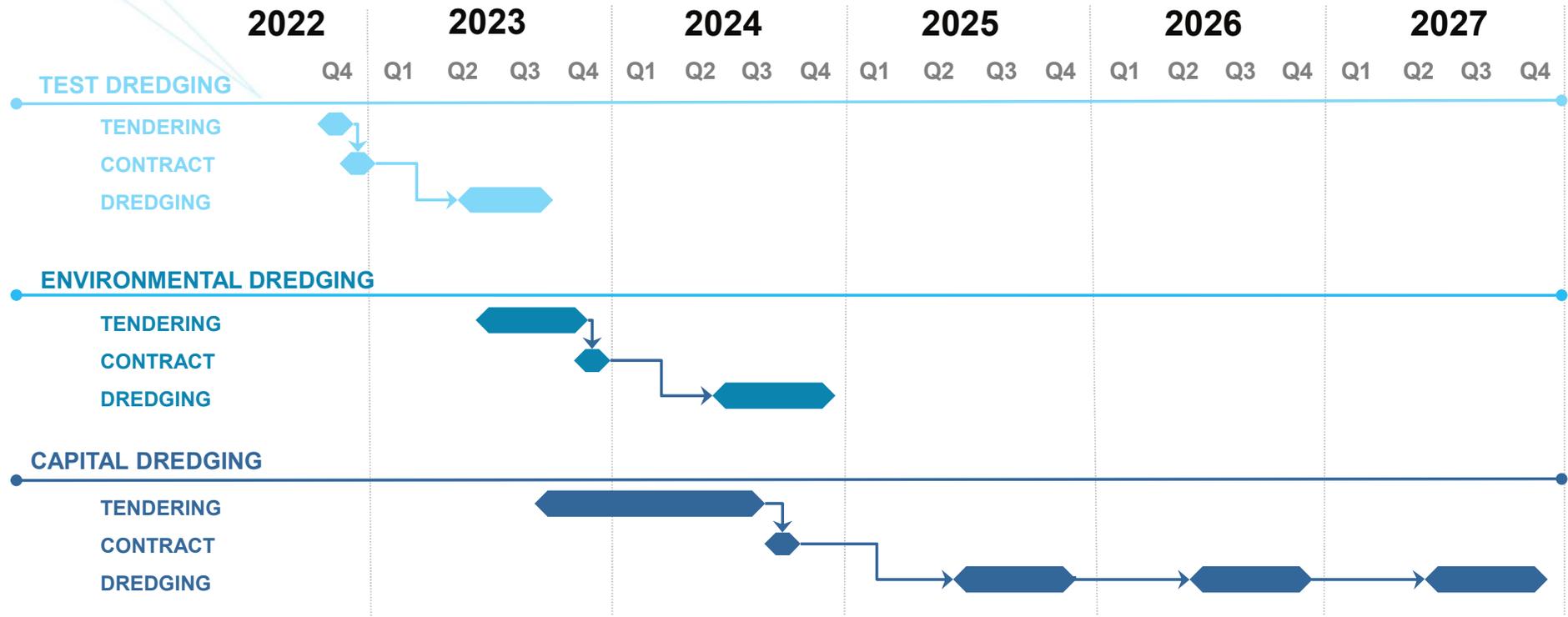
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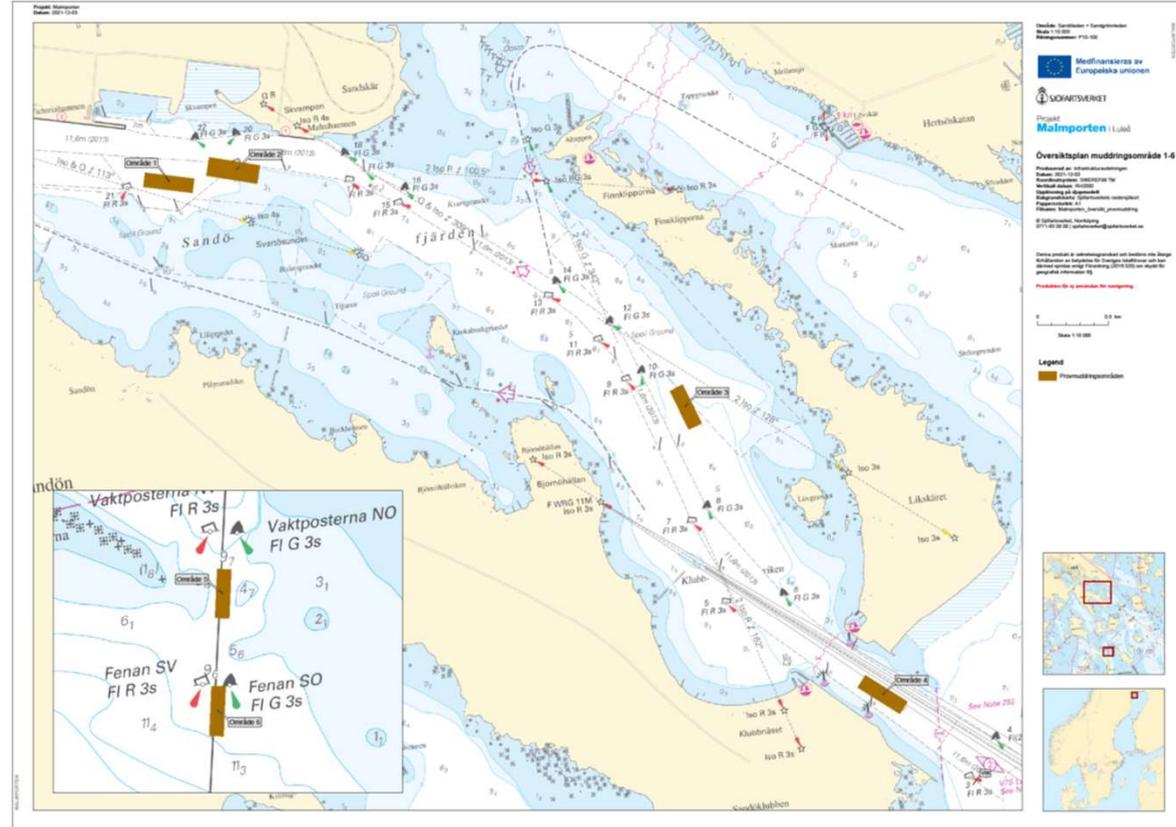
For Malmporten there will be three different procurements from SMA during the next 2-3 years



Test dredging (TSHD) – Purpose is to improve and confirm knowledge of the geological and geotechnical conditions

- Test dredging summer of 2022, cancelled due to high tenders
- Ongoing optimization to lower the cost

- Construct contract (AB 04)
- Tendering apx. Q4 2022
- Dredging apx. between may → aug 2023

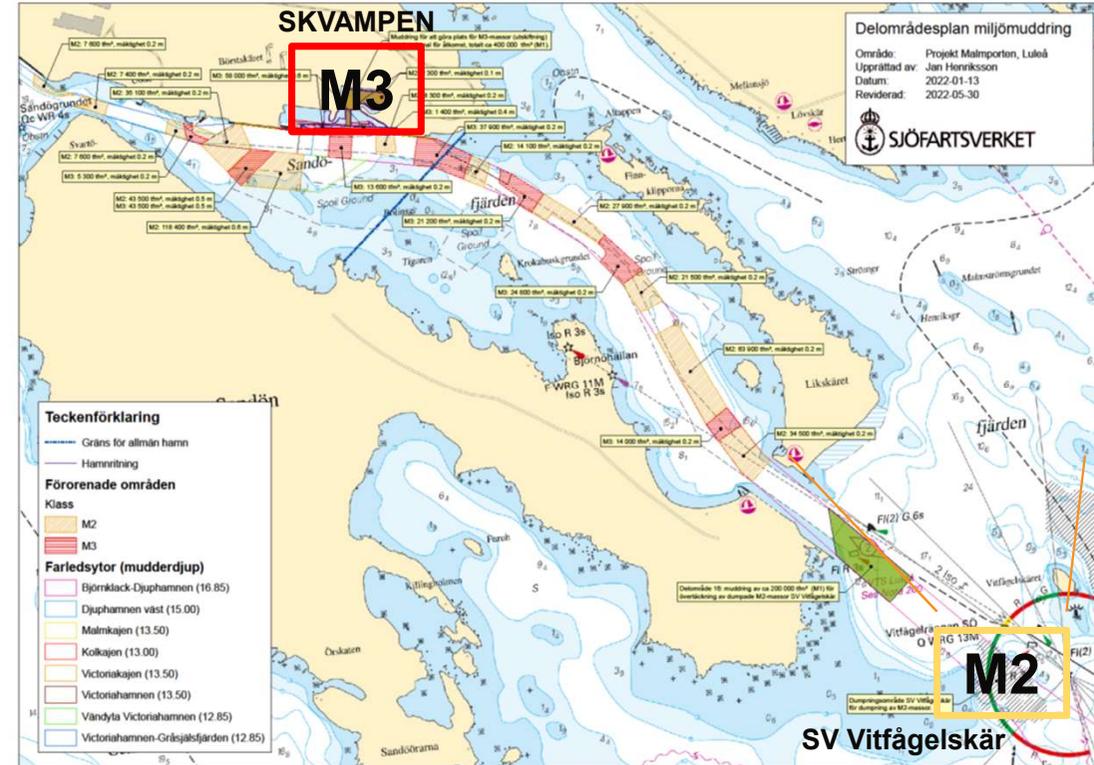


Environmental dredging – Includes the contaminated sediments but also the preparation in the port area for the capital dredging

- 0,85 million m³ replacement of M1 to fit M3 and hydraulic filling around Skvampen
- 0,4 million m³ M2 → SV Vitfågelskär
 - layers 0,2 – 0,6 m
 - tipping in former borrow area – 25 m, through tube from surface to seabed
 - protective cover of 1 m sand
- 0,2 million m³ M3 → Skvampen
 - layers 0,2 – 0,6 m
- 1,65 million m³ M1 in the port area to prepare for rocks blasting

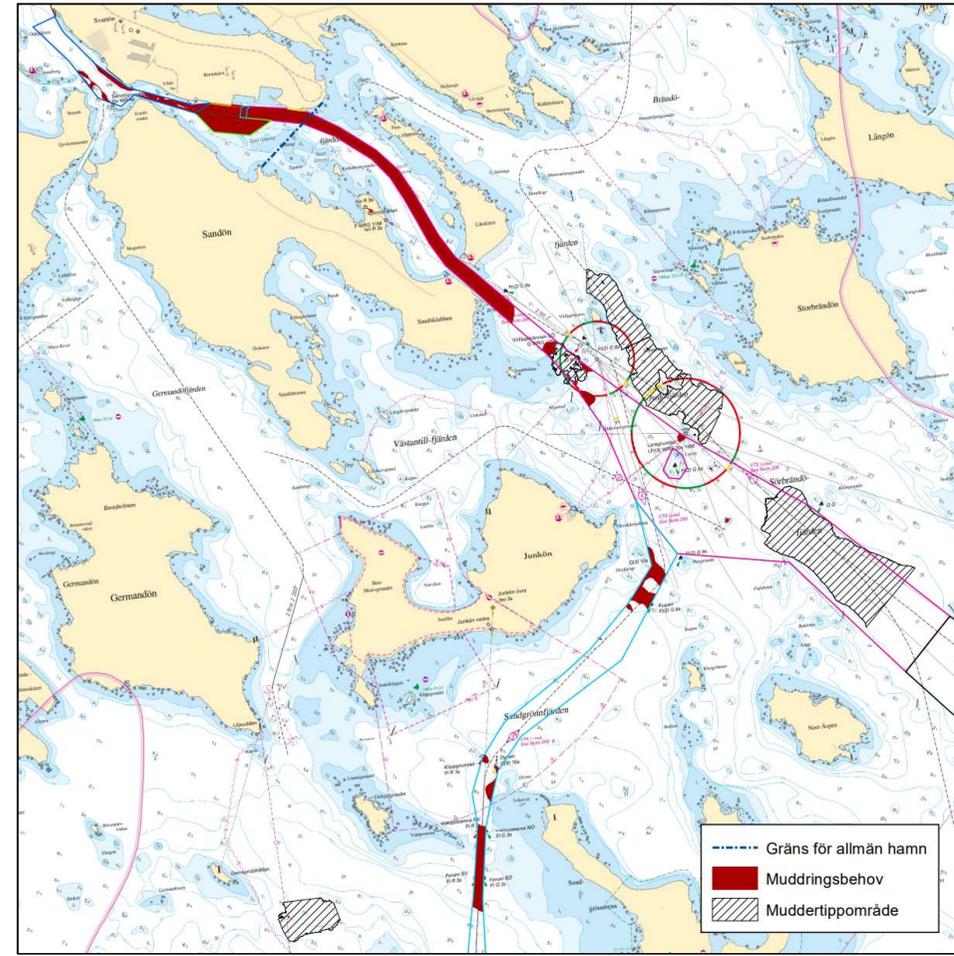
Most likely construct contract (AB 04)

- Tendering apx. Q2 → Q4 2023
- Dredging apx. may → nov 2024



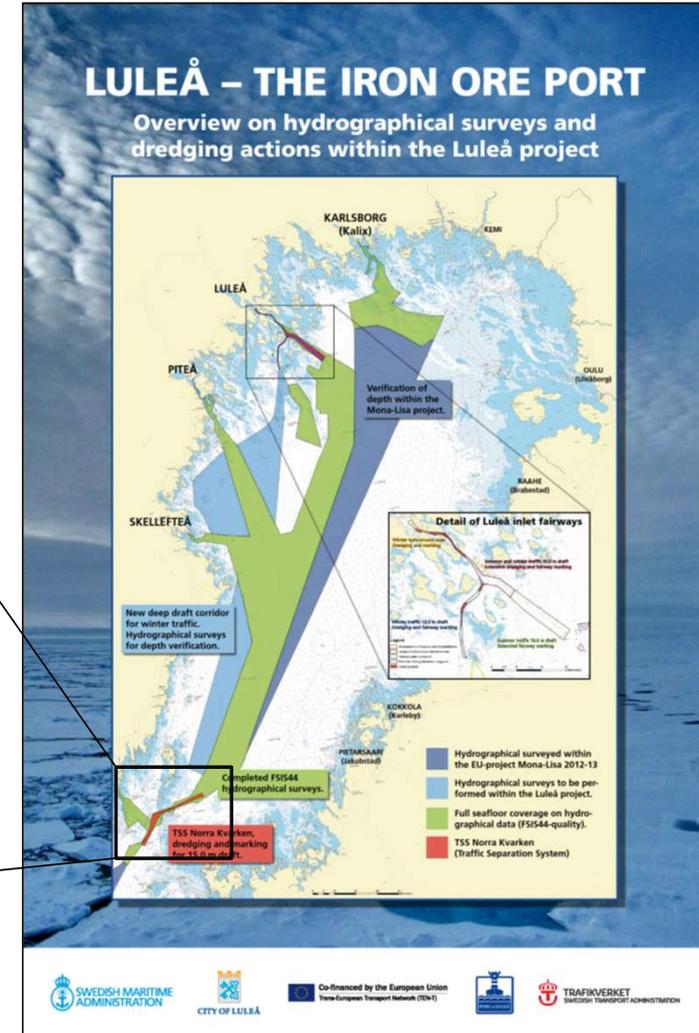
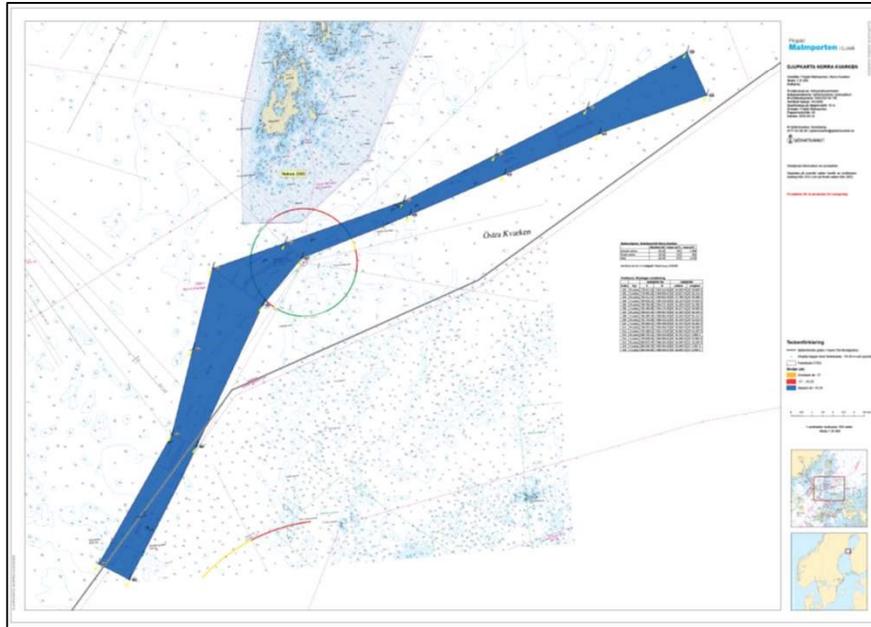
Capital dredging – Majority of the dredging works but also key interface with the landfilling of the port area

- 17,7 million m³ to be dredge down to – 17 m
 - 16,7 million m³ silt, clay, sand and till (moraine)
 - 1 million m³ rock blasting
 - 1 000 m³ N Kvarken
 - Rocks from blasting to be used for LHAB's new quay
 - Sandy material for landfilling areas (40 he)
 - Erosion protection 50 000 m³ (950 m)
 - Dumping in five different areas
-
- **Most likely construct contract (AB 04)**
 - **Tendering apx. Q3 2023 → Q3 2024**
 - **Dredging apx. may → nov 2025 – 2026 - 2027**



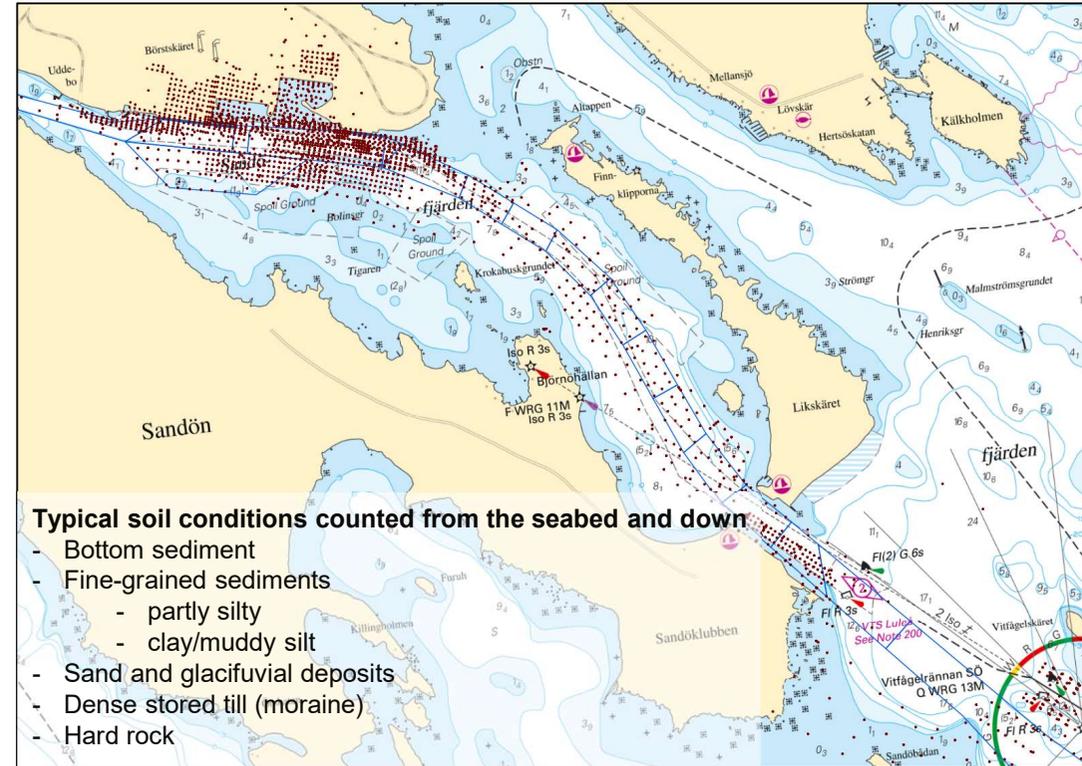
Norra Kvarken – As a part of the Capital dredging to ensure Baltic Max depth all the way to Luleå

- 1 000 m³
- 1/3 of the dredging works for Finland



Data collection and soil investigation – Over the years in order to describe and calculate volumes for the different fractions

- Bathymetrical surveys by multibeam
- Thousands bore holes → 3-D database
- Vim → Weight penetrations test
- CPT → Cone penetration test
- HfA → Ram penetration test
- Jb2 → Soil-rock penetration test
- Kv → Piston samplers
- Skr → Auger samplers
- SPT → Standard penetration test
- Seismic reflection survey
- Laboratory analysis



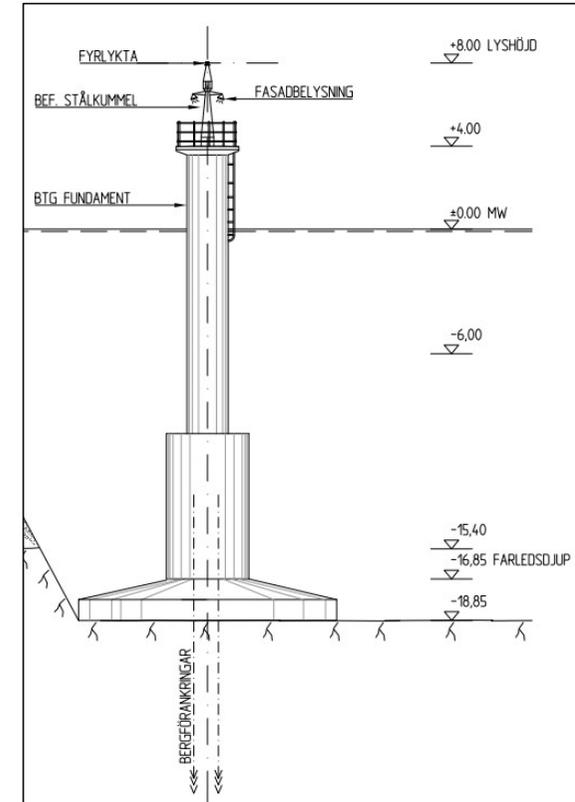
Test dredging – With backhoe to confirm dredgability of the till (moraine) performed 2015

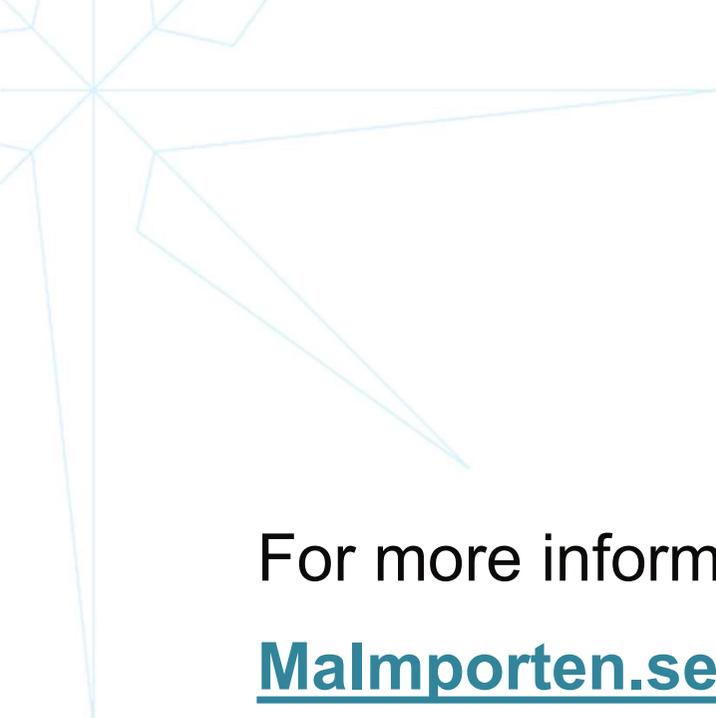
- Nordic Giant, 380 tons
 - Bucket size 13 m³
 - Maximum dredging depth 18 m



Challenges – That could also lead to possibilities with connecting contracts and/or optimization

- Dredging volumes, 21 million m³ to be dredge down to about 17 m
- Subglacial deposits and large volumes of rocky till (moraine)
- Rock that are to be blasted and reused partly as landfill material in port areas
- Landfilling to parallel works for Luleå Hamn (Port of Luleå), *separate contract for LHABs work planned for tendering Q4 2022.*
- Ice free seasons approximately 6-7 months/year
- Parallel works with nautical equipment by SMA, *separate contract for foundations for lighthouses planned for tendering 2024 by SMA*
- Continuity of shipping operations in existing fairway, without disruption from dredging





For more information and updates, visit

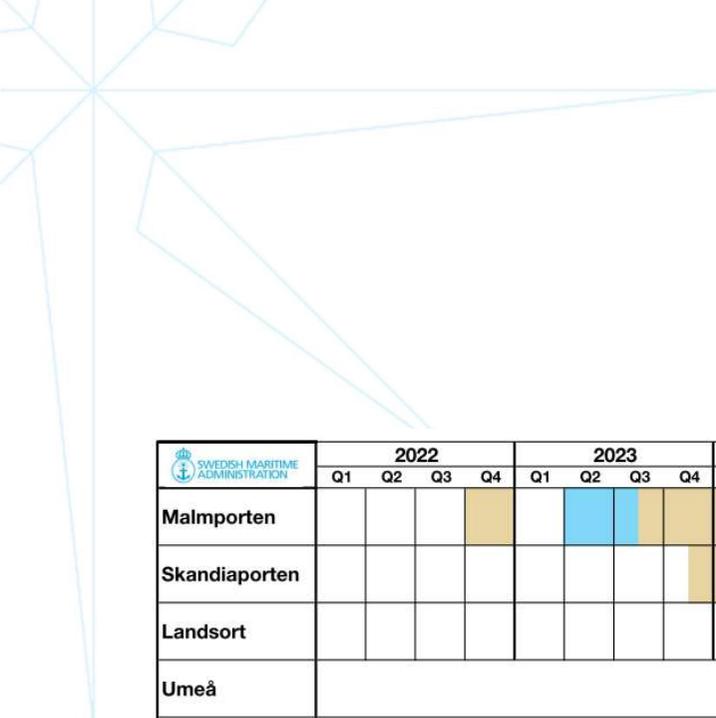
[MalImporten.se/en](https://malimporten.se/en)

[MalImporten \(sjofartsverket.se\)](https://malimporten.sjofartsverket.se)

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SWEDISH MARITIME ADMINISTRATION	2022				2023				2024				2025				2026				2027				2028				2029				2030			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Malmporten				Planned procurement		Planned implementation		Planned implementation																												
Skandiaporten								Planned procurement				Planned implementation																								
Landsort										Planned procurement	Planned procurement			Planned implementation	Planned implementation	Planned implementation																				
Umeå	Too uncertain to predict. Procuement estimated in 2025. Less then one dredging season, planned in 2025 or 2026																																			
Karlskrona	Too uncertain to predict. Procuement estimated around 2024/2025. One dredging season.																																			
Sundsvall																																				
Landskrona																																				
Ystad																																				

