Gemeente Amsterdam

Version 1 . 0
Date 27 May 2021
CEB/OVG/25943

Offerteaanvraag

In het kader van de Raamovereenkomst levering

Tractievoedingscomponenten tussen GVB Infra en Opdrachtnemer

Tram nieuwbouw gelijkrichterstation locatie Osdorpplein

Referentienummer: **2021-36**
Datum: 10 mei 2021
Status: Definitief
Versie: 1.0

GVB Door en door Amsterdam

Versioning

Amended in the version

Version	Date	Description	Modified by:
0.1	15-05-2021	New document	Will de Jager
0.2	27-05-2021	Supplemented	Will de Jager
1.0	27-05-2021	Supplemented	Leo Snel / Jos Meester

Contents

Introduction

At the site of the present Osdorpplein district office, a multifunctional building will be built, which has been given the name Project MIX.
This building will contain offices, shops, a story house/library, parking and a public bicycle shed. There will also be 528 homes, 30% of which will be social housing (158 homes).

Those involved in the project are:
Ingenieursbureau van de Gemeente Amsterdam (IB)
MRP Development (Developer)
De Architecten Cie (Architect)
Municipality of Amsterdam, Land Development (G&O)

The planning is as follows:
Demolition of current city office: June 2022
Start of construction MIX: September 2022
MIX delivery: 1st half 2025

The current Osdorp rectifier station is located at a location that hinders the realisation of MIX. The intention is to provide a space in the MIX building where the Osdorp rectifier station can be relocated.

This report describes the work required for this.

Abbreviations

Abbreviation	Meaning
AVP	General Power Supply Point (of grid operator Liander)
EMC	ElectroMagnetic Compatibility
FAT	FActory Acceptance Test
GRS	Rectifier station
HVI	High-voltage distribution system
kV	Kilovolt
MVA	Mega Volt Ampère
OBA	Amsterdam Public Library
OD	Osdorp
OG	Client
ON	Contractor
OR	OverviewRetour
SAT	Site Acceptance Test
SIT	Site Integration Test
CHP	Heat/cold storage

Binding documents

The following documents, annexed to or associated with the Framework Agreement, are binding on this invitation to tender.

Title	Document number	Versio	Date
System Specification Traction Rectifier	CEB/OVG/25342	8.0	14-5-2021
Additional requirements Indoor Rectifier Station	CEB/OVG/24279	1.0	16-11-2020
Memo RHDHV Plan of approach GRS Osdorp	BG5867TPNT2010020906	-	03-12-2020

1. Tendering procedure and applicable requirements and conditions

This request for quotation concerns a further request for quotation which has been concluded between GVB and the Contractor in the context of the Framework Agreement for purchase and delivery of traction power components for rectifier stations for tram and metro.
This request for proposal is part of the tendering procedure and is intended to provide an impression of how the Contractor will draw up a proposal for a sub-project.
This is a real project that will be realised in due course and for which the winning Tenderer will supply the Traction Power Plant.
The Tenderer's Quotation will need to comply with all requirements from the Programme of Requirements (Appendix 8), the requirements from the Framework Agreement (Appendix 11), the requirements from the Tender Guidelines and, if applicable, any extra offer on top of these requirements that the Tenderer makes with its Tender. Together with its Tender for the tendering procedure, the Contractor will submit an Offer as referred to in Article 27 of the Framework Agreement.

This request for quotation is entirely without obligation. An order is concluded after the parties have reached a Further Agreement for this partial order on the basis of a final quotation from the Contractor.
The tender to be submitted consists of:

- A Preliminary Design of the traction power plant requested by the Client, including the relevant data that influence the location in which the traction power plant will be placed;
- An itemised quotation of the Traction Supply Components requested by the Client;
- A statement of the delivery time of the Traction Supply Components requested by the Client.

We will explain these parts of the requested offer in more detail here.

1.2 Drawing up the preliminary design

The preliminary design of the traction power supply system must comply with the process requirements as set out in:

- PoR Part 2 process requirements.

Furthermore, the installation must comply with the system specification as contained in:

- PoR Part 1A Tram Rectifier System Specification
- The traction supply system must be designed on the basis of the following principles:
    - Number of traction groups: 1
    - Power per traction group: 2.0 MVA
    - Variant 2
    - Number of quick-switch fields: 2
    - Number of outgoing sections: 2
    - Variant/fields/sections 2/2/2
- PoR Part 1E System Specification for Power Supply

Furthermore, the preliminary design contains an overview of the aspects that need to be taken into account during the construction of the site and the civil works to be carried out around the site, such as, but not limited to, floor load, dimensions of equipment, accessibility of equipment to the site, internal heat load, ventilation, cooling, shielding EMS, etc.

1.3 Drawing up an itemised quotation

The tender to be submitted shall contain an itemised quotation of the following components:

1. Supplying high-voltage switchgear (HVI)
2. Supplying traction transformer
3. Supply rectifier
4. Supplying direct current distribution box (GVI)
5. Providing security
6. Supplying internal wiring
7. Supplying local control including management software
8. Supply of low-voltage power supply including own operating transformer (EBT)
9. Supply low-voltage switchgear (LVI)
10. Engineering traction power plant
11. Engineering Local control
12. Coordination link with CBI
13. Execute FAT
14. Optional implementation FIT
15. Support of installer in combined SAT/SIT execution
16. Installer support during commissioning
17. Support installer in performing short-circuit tests
18. Training and education GVB EV mechanics, operators and asset managers

1.4 Drawing up a detailed planning

The quotation to be provided shall include a detailed production and delivery schedule of the Traction Power Supply components from the Supply and shall be based on the
included in the Schedule of Requirements. The schedule should be aligned with the schedule for this project shown in Section 7. The equipment must be delivered and FAT by 20 December 2023 and available for SAT and on-site installation. You should adjust your planning accordingly.

2. Location

The current location of the Osdorp tram rectifier station is in the Nicolaas Anlijnstraat in Nieuw-West.

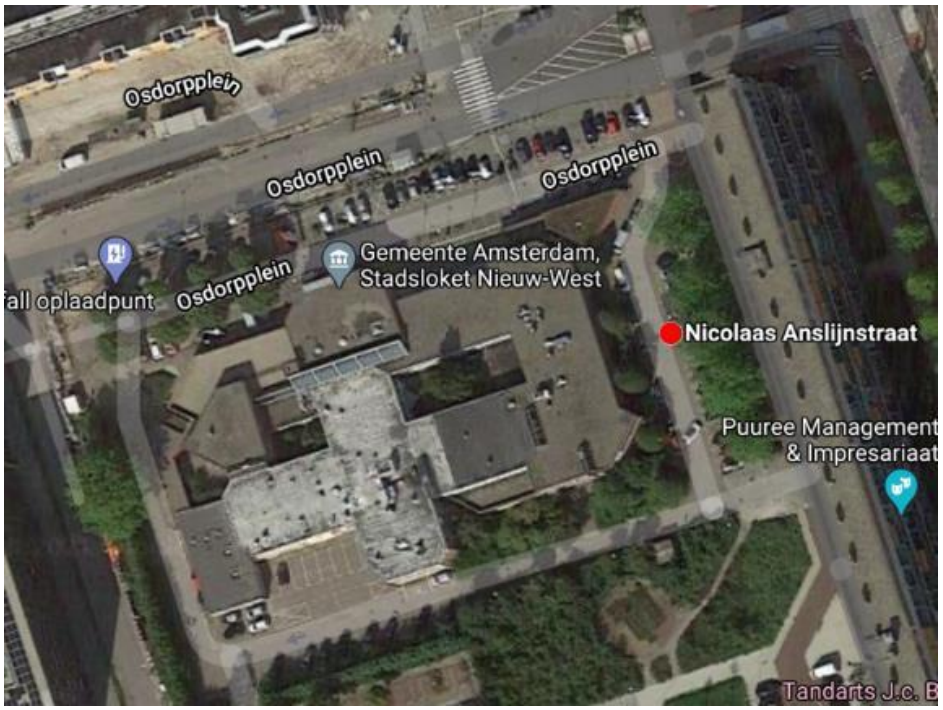


Figure 1-1 Satellite picture of current location GRS Osdorp

The dimensions of the current rectifier station are smaller than those of the new rectifier stations to be built because the split between the installation of the grid operator (the regulated domain) and the customer installation (the free domain) is not yet present here. The medium-voltage distributors of the grid manager and CFP/MET are integrated into one distributor here.

Figure 1-2 Current rectifier station Osdorp (front side)

Figure 1-3 Current rectifier station Osdorp (rear side)

Figure 1-4 New location rectifier station Osdorp

The new location of the Osdorp rectifier station is indicated with a red dot.

3. Integration in MIX building

In the MIX building, space is provided for the rectifier station at ground level. The required space was initially based on the dimensions of the existing rectifier station. As stated in the previous chapter, a purchase station for the network operator Liander must be provided in the event of new construction. Because of the separation of high-voltage and low-voltage installations, the high-voltage distribution system (HVI) will also be placed in a separate room.
Since this could not be fitted into the layout of the building, a solution was found in consultation with Liander in the form of a combined purchasing area. The building already had purchasing areas for the garage/WKO and the Public Library (OBA).

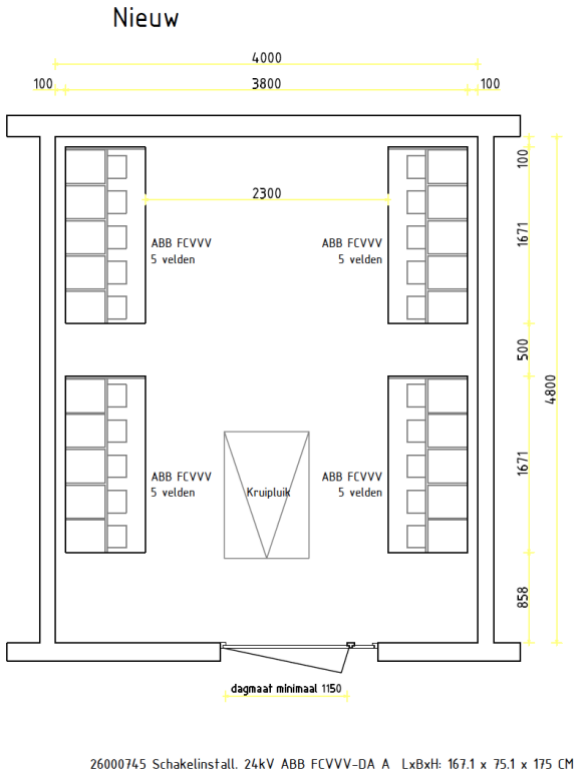


Figure 2-1 Combined purchasing capacity Liander

At ground level, a transport route runs through the building; this is also the entrance to the parking garage. The combined purchasing station is located on one side of the transport road; the actual rectifier station on the other side. The crossing of the supply cable from the rectifier station is carried out with sheath tubes through which the supply cables are pulled. As an additional protection against excavation damage, concrete plates are laid on top of the tubes. Alternatively, the cables can be placed in a concrete cable duct. The cable is laid 1 metre below ground level.

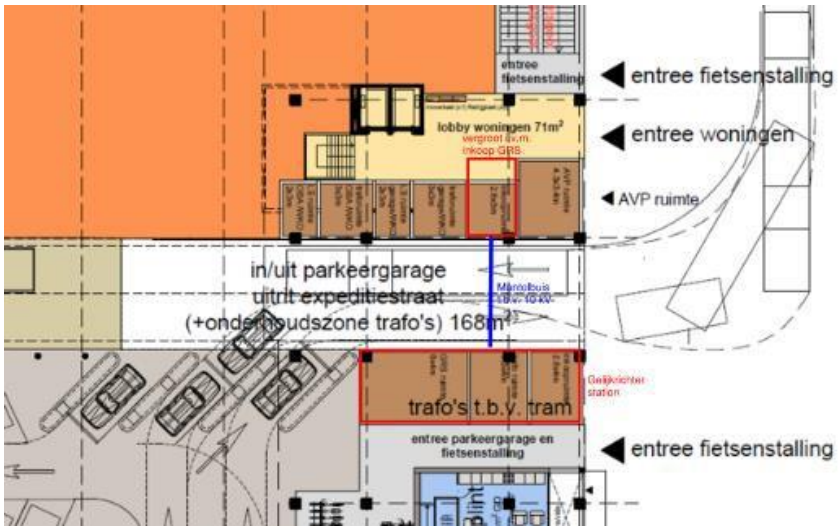


Figure 2-2 Rectifier station integration in MIX building

In the drawing, the combined purchasing area is located at the top of the shipping lane. The purchasing space in the drawing will be enlarged for this purpose and will have the same depth as the adjacent AVP space. The AVP room is the General Power Point for the energy supply of the houses.

Because the purchasing area is included in the combined purchasing station, the layout of the rectifier station can be the same as the typical rectifier station without purchasing, possibly in a mirrored form.

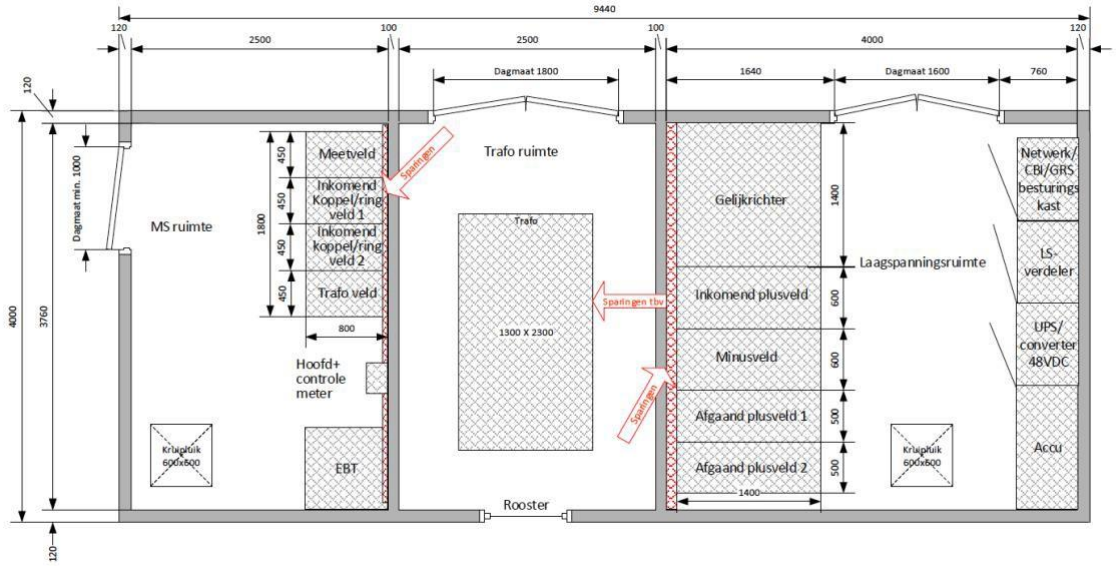


Figure 2-3 Typical rectifier station without purchase

4. Requirements for the rectifier station

The rectifier station shall comply with the requirements of a standard rectifier station, including annexes.
In addition, the additional requirements for an indoor rectifier station must be met.

Compared to a standard tram rectifier station, we have the following deviations:

1. The structural part of the rectifier station is part of a multifunctional building; it is an indoor rectifier station.
2. The purchasing station of the grid operator is not structurally integrated in the rectifier station, but is located on the opposite side of the transport road.
3. The purchasing station is combined for other users of the MIX building. Only Liander has access to this area.
4. Because of point 2, the coupling cable between the purchasing distributor of the grid operator and the high-voltage distribution system (HVI) of GVB/MET does not run directly through the cable cellar of the rectifier station, but through the public space (under the transport route). Additional protection against excavation damage in the form of sheathing pipes and concrete plates.
5. The old rectifier station must be dismantled and demolished. Materials must be transported to a certified waste processing company. The building is asbestos-free.
6. In addition to realising a new connection to Liander's medium-voltage grid, the old connection must also be cancelled.
7. The plus and minus cables to the track need to be cleaned up and connected to the new GRS. Due to the age of the cables it is probably necessary to replace them completely; possibly also the minus box(es). Any plus boxes can be dispensed with.
8. An indoor rectifier station places additional demands on noise, vibration, fire load and EMC. EMC cladding and/or sound-absorbing finishes may be required.

4. Work Breakdown

The basic assumption is that the existing rectifier station will remain in operation until the new rectifier station is commissioned and will then remain on stand-by for at least two weeks in order to take over the traction power supply if the new rectifier station fails. How this is possible will have to be worked out in more detail.
After the new rectifier station has operated flawlessly for two weeks, it can be removed.

Work:

1. Fitting out Liander's purchasing station with ring earth, earth electrodes, electricity, lead-throughs. Because this concerns a combined purchasing station, agreements must be made about who will carry out the work and how the costs will be divided.
2. Installation of distributors in the purchasing station and connection to the medium-voltage ring by Liander.
3. Crossing of the medium-voltage cable in a conduit. Protect the top of the cable duct from damage during excavation work using concrete slabs. Lay cable with overlength in the cable cellar of the Liander purchasing station and the rectifier station.
4. Equipping the rectifier station in accordance with standard requirements and additional measures at the indoor rectifier station: detail engineering, ordering components, FAT, installation.
5. Weld plus and minus cables to the new rectifier station or renew completely, insert, connect.
6. Connecting the coupling cable between the purchasing station and the HVI under the supervision of Liander. In fact, this is not very different from a standard rectifier station.
7. Commissioning of the installations, SAT, SIT.
8. Removal of medium voltage connection of old rectifier station.
9. Removal of the old rectifier station.

5. Feeding area GS Osdorp

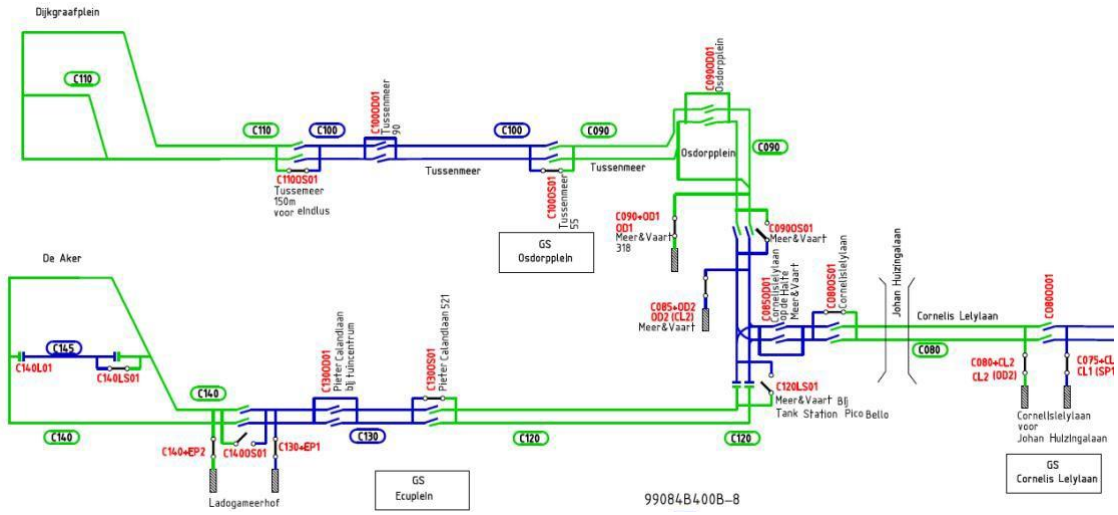


Figure 5-1 Circuit diagram surrounding GS Osdorp

Two feed points at Meer & Vaart are supplied from the Osdorp rectifier station: section C090 via cable OD1 and section C085 via cable OD2. Section 085 is also supplied from the other side by the rectifier station Cornelis Lelylaan. Section C090, however, has a single-sided power supply from the Osdorp substation. In the event of a failure of the GS Osdorp, section C090 can be electrified again by closing the coupling switch at Meer & Vaart.

In the Network Analysis Tram Network of Amsterdam, version A, 23 October 2018, Arcadis noted the following:

In normal operation, GS Osdorp feeds the overhead line section up to the Dijkgraafplein stop. However, in the event of a failure of Osdorp contactor, Cornelius Lelylaan must be supplied up to the Dijkgraafplein stop. In N-1 operation of GS Osdorp, this may lead to problems with the supply voltage. At N-1 GS Osdorp, the voltage drops to approximately 400 V, but tram traffic continues to run, so that this situation is acceptable in principle. However, this is not a situation that should be maintained for a long period of time.

GS Osdorp is therefore an important rectifier station, as the section from Osdorpplein to Dijkgraafplein is fed on one side from GS Osdorp.

6. Cables

The existing plus and minus cables date from 1993 and are in the MVP for replacement in 2023. At the same time as replacing the rectifier station, the 600V cables also need to be replaced.

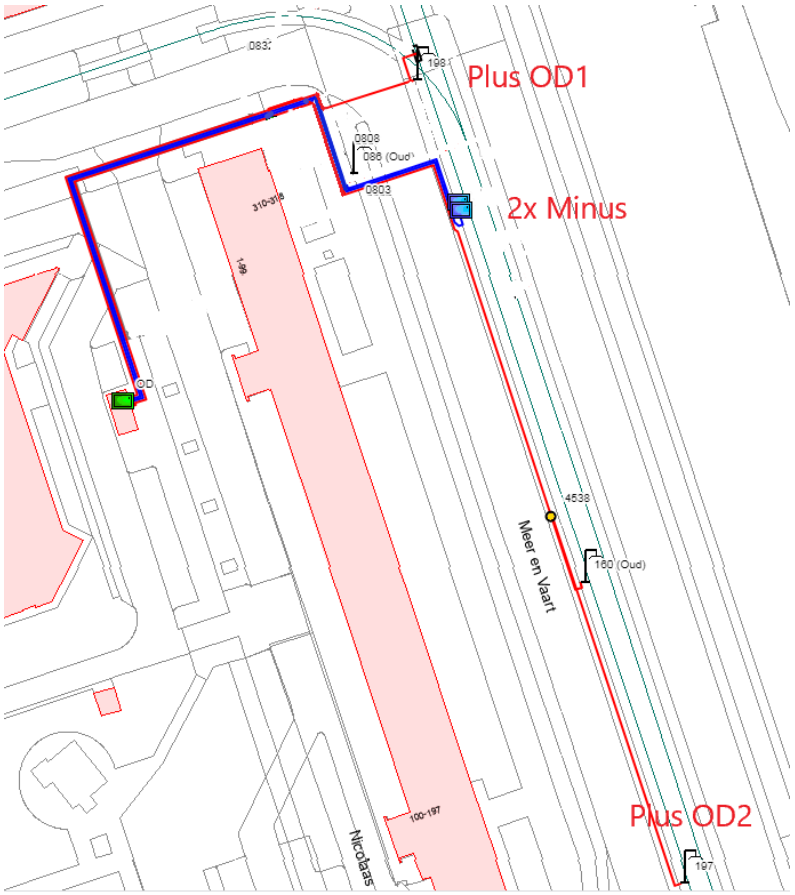


Figure 6-1 Cable run from GS Osdorp (red = plus; blue = minus)

The cables run from GS Osdorp to Meer en Vaart, where there are two feed points; one fed by field OD1 (198) and the other by OD2 (197). Furthermore, there are two minus boxes set up next to each other. This is an unusual situation that probably arose due to changes in the local infrastructure. The drawing also shows two obsolete feed points 086 and 160. To avoid EMC, feed points and minus boxes are always placed together. It is therefore preferable to change the location of the minus boxes at the same time as replacing the cables. A trench must then be dug anyway and the plus and minus cables can be laid in the trench together.
An additional task is to move the minus boxes and to make 4 cembre connections in the rail and 4 connecting cables 120 mm2 Cu to the minus box per minus box.
Below is an overview of the current cables and cable lengths. Because several cables are laid in one trench, the number of metres of digging and backfilling is less than the total cable length.

Equipment	Description	Object type	MVP	Length [m]	cablenum	600V cable type
10053405	600V Cable OD1	ZRSTEV601	2023	97,51	11001183	EG-YMeKas/3kV-1X630+as75
10053406	600V Cable OD2	ZRSTEV601	2023	184,25	11001186	EG-YMeKas/3kV-1X630+as75
10053216	600V Cable MIN041	ZRSTEV701	2023	120,84	11001184	EG-YMeKas/3kV-1X630+as75
10053217	600V Cable MIN042	ZRSTEV701	2023	123,85	11001185	EG-YMeKas/3kV-1X630+as75

Table: Overview of cable lengths

For the estimation we assume:
200 metres trench digging and
backfilling; 300 metres plus cable 1x630
mm lay; 300 metres minus cable 1x630
mm2 lay;
Connect 2 plus cables in GS to the outgoing plus field;
connect 2 minus cables1 in GS to the return conductor field; connect 2 plus cables to BVL switch;
Move 2 minus cupboards;
Connect 2 minus cables to minus box;
make 8 Cembre connections;
8 cables from track to minus box;

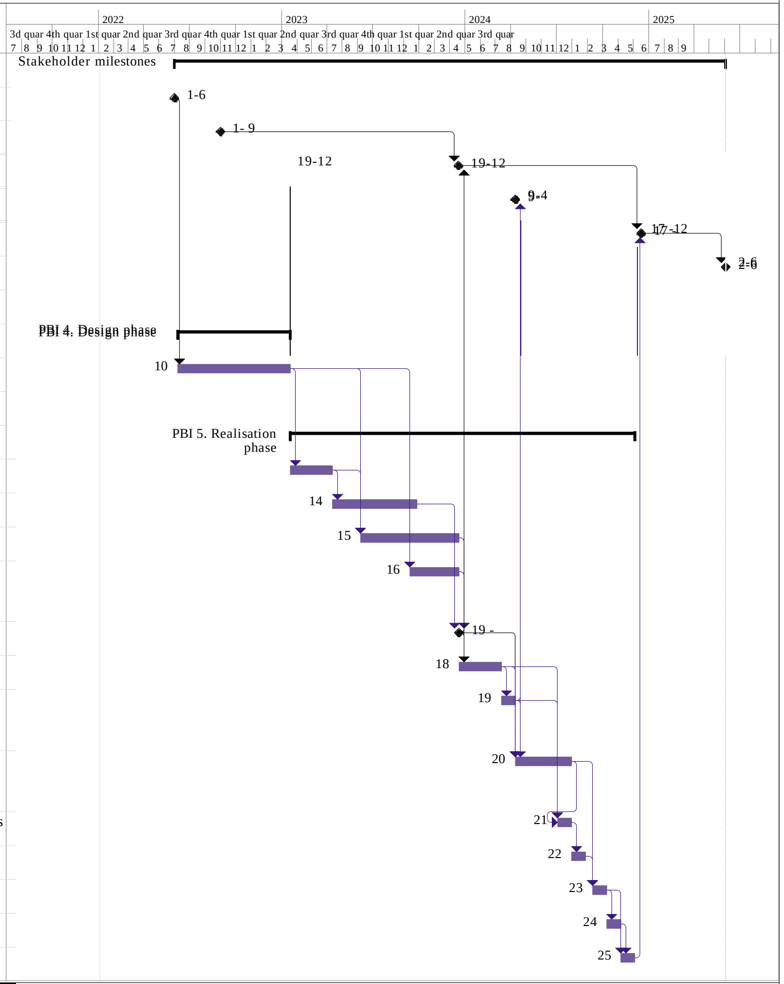
The drawing shows that the Meer & Vaart roadway must be crossed. At the moment it is unclear whether there are conduits under the road or whether the cables have been laid 'cold in the ground'. Otherwise, the road will have to be broken up (asphalt) and repaired.

[1] To comply with NEN-EN 50122-1, one extra minus cable may need to be laid.

7. Planning

Gemeente Amsterdam

Id	Task	Dura	Be g in d a	End d a	F o r e f o r e f o r e s t
1	Stakeholder milestones	784 days	1-6-22	2-6-25	
2	Start of demolition of current city office	0 days	1-6-22	1-6-22	
3	Start construction MIX	0 days	1-9-22	1-9-22	
4	Technical rooms GVB ready MIX	0 days	19-12-23	19-12-23	3BE+12 mn;17
5	Liander purchasing station in operation	0 days	9-4-24	9-4-24	19
6	Start redevelopment Nicolaas Anslijnstraat (existing GS Osdorp demolished)	0 days	17-12-24	17-12-24	25;4BE+13 mn
7	Delivery MIX	0 days	2-6-25	2-6-25	6BE+6
8					
9	PBI 4. Design phase	160 days	8-6-22	17-1-23	
10	Drafting DO + contract	8	8-6-22	17-1-23	2
11					
	PBI 5. Realisation phase	490 days	18-1-23	3-12-24	
13	Contracting the installer	3 months	18-1-23	11-4-23	10
14	Preparation of installation work GS Osdorp	6 months	12-4-23	26-9-23	13
15	Ordering components GS Osdorp	7 months	7-6-23	19-12-23	10;13BE+8 wkn
16	Article 12 Application for permit to relocate facilities CFP/ET(13 weeks before execution at the latest)	14 wks	13-9-23	19-12-23	10
17	Start of furnishing GS Osdorp	0 days	19-12-23	19-12-23	15;14;16
18	Installation in GS Osdorp MIX	3 months	20-12-23	12-3-24	17
19	Connection of interconnecting cable between the purchasing station and HVI under the supervision of Liander MIX	1 month	13-3-24	9-4-24	18
20	Construction and removal of cabling in public space GS Osdorp <> connection overhead tram	4 months	10-4-24	30-7-24	17;18;19
21	Connecting external cabling GS Osdorp MIX	1 month	3-7-24	30-7-24	18;19;20BE-4 wks
22	Commissioning the GSOsdorp MIX installations	1 month	31-7-24	27-8-24	21
23	Removal of medium-voltage connection old GS Osdorp	1 month	11-9-24	8-10-24	22BE+2 wkn;20
24	Test company GSOsdorp	1 month	9-10-24	5-11-24	23
25	Renovation of the old GSO village	1 month	6-11-24	3-12-24	23;24



Project: Relocating GS Osdorp
Version: 0.2 CONCEPT
Date: 27-5-21

Task | Milestone | Summary