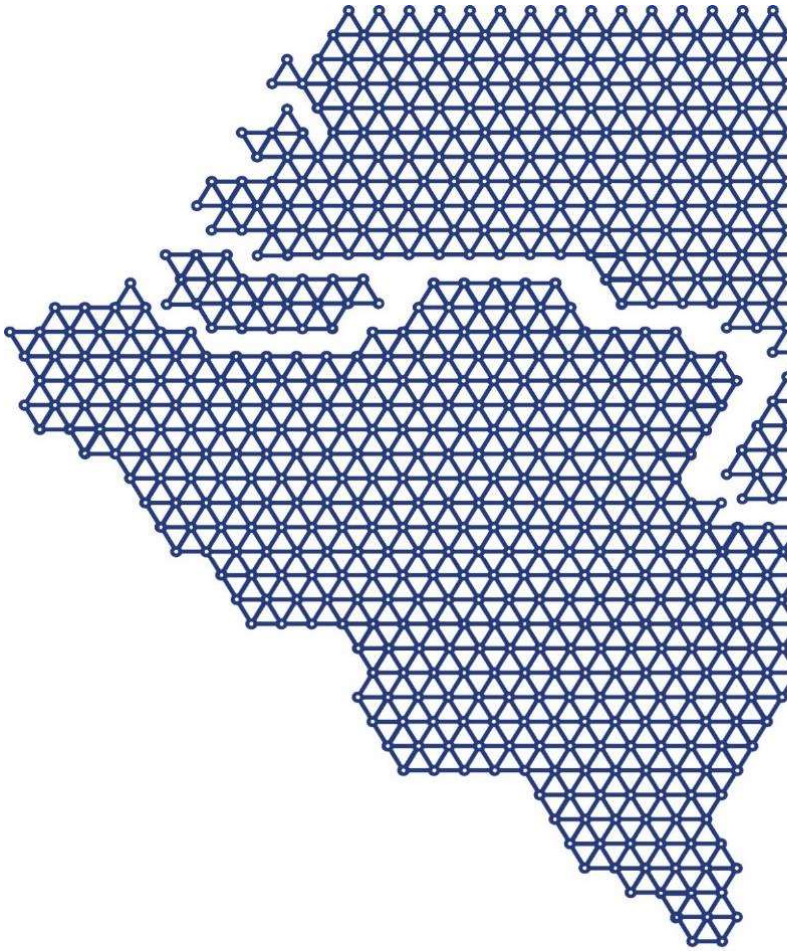

Einstein Telescope

Progress Report
Period 2024-Q1

P1.3_015 Version 1.0

ET-EMR project office

Authorisation

Name	Position	Initials
Stan Bentvelsen	Director - Client	Adopted
Arjen van Rijn	Director - Client	22 April 2024
Hans Plets	Director - Client	
Martijn Rumpen	Senior Strategist - Advisor	
Henk Schroen	Communication Manager - Advisor	
Guid Bartholomée	Project Manager- Contractor	
Wim Walk	Technical Manager - Implementation	
PM	Environment Manager - Implementation[1]	
-	Contract Manager - Implementation[2]	
John Kerstjens	Project Control Manager - Implementation	

[1] The Project Office Directorate has in 2024-Q1 started the recruitment procedure.
[2] In the current phase of feasibility studies, Project Control also includes Contract Management.

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1 Introduction

This Progress Report 2024-Q1 provides an overview of the progress in the first quarter of 2024.

The Einstein Telescope opportunity

The objective of the Einstein Telescope is to build a large-scale research infrastructure that will be the next generation gravitational wave detector for further scientific research of the cosmos. The Einstein Telescope is adopted in the 2021 European roadmap for research Infrastructures (ESFRI). This confirms the excellent science case and the plans to construct the Einstein Telescope in Europe and the following steps towards a site selection.

The starting conditions of the Euregion Meuse-Rhine to host the Einstein Telescope are favourable. This region offers strong research institutes and high-tech industry. And the infrastructure and international living and business climate are attractive. The Einstein Telescope offers the Euregion Meuse-Rhine an unique opportunity to take a global leadership position in a new pioneering area of science: gravitational wave research. Housing the Einstein Telescope in this region will boost a positive impact on science, economy and society.

ET-EMR Taskforce and Project Office

At the ET Ministerial Conference 26 September 2023 in Brussels, delegates from Belgium, the Netherlands and the German Federal State of North Rhine-Westphalia agreed to make preparations towards a bidbook and joint consortium to establish the Einstein Telescope in the Euregio Meuse-Rhine. The ET-EMR Taskforce has several tasks, including the preparations for the bidbook and the host consortium. The ET-EMR Project Office has the responsibility to deliver all the feasibility studies (civil engineering, geology, environmental planning and cost) to realise the Einstein Telescope in the Meuse-Rhine Euregion. The ET-EMR Project Office has started preparations for executing the necessary feasibility in January 2023. The Taskforce assigned the Project Office to coordinate all preparations for the EMR bidbook in its meeting 5 March 2024. The Project Office Directorate is preparing to present a first proposal and timeline for the bidbook to the Taskforce and the Ministerial meeting in May.

Feasibility studies and progress reports

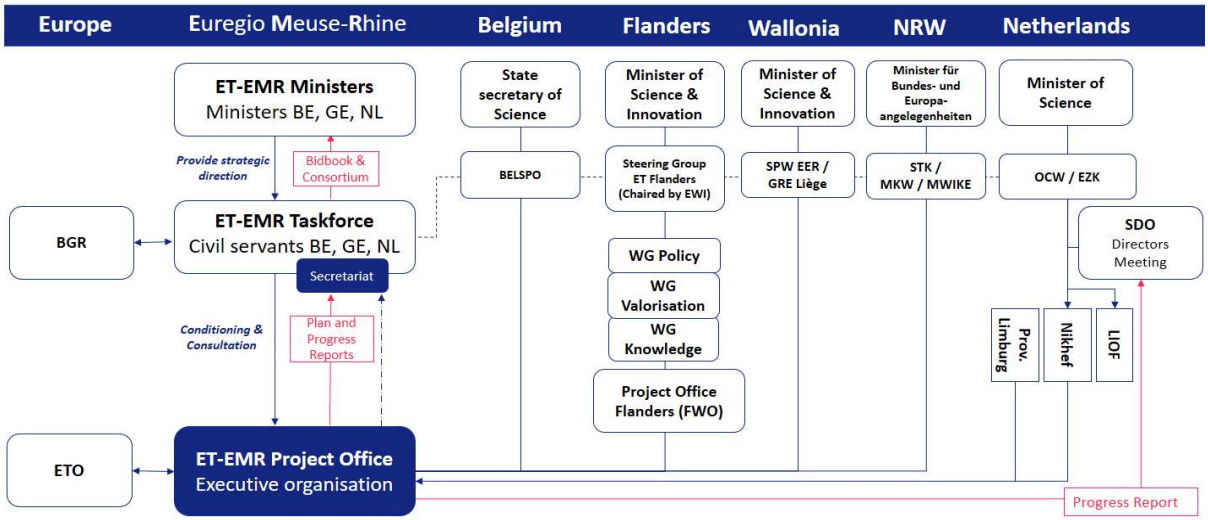
It is clear that a feasible plan to construct and operate the Einstein Telescope strongly relies on necessary governmental conditions, both financial and legal. The Project Office therefore addresses these issues at the ET-EMR Taskforce to provide these conditions in the process of preparing a feasible bidbook and the forming of a host consortium. To ensure a clear understanding of each other's expectations, a close cooperation and open communication between the Project Office and the Taskforce is of crucial importance. In that respect, the Project Office provides the Secretariat to the Taskforce. There is a monthly meeting with the Taskforce Steering Group. And the Taskforce also receives and discusses all quarterly progress reports.

2 Project management

2.1 Administrative and political context

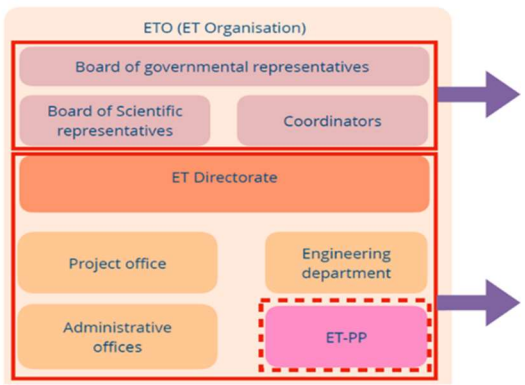
ET-EMR context

In 2023, the Project Office Directorate decided to work according to the IPM (integrated project management) model structure and implement this. The following figure below shows the position of the Project Office in the ET-EMR governance structure and the international cooperation:



European context

While the ET-EMR Project Office is focused on site-specific aspects, the European ET Organisation (ETO) is setting up the organisation to prepare a plan for the Einstein Telescope: the technical design, the organisation and financial management. The ETO Directorate has announced to develop a roadmap. The highest decision making body at European level, the Einstein Telescope Board of Governmental Representatives, will also have to agree on the process of realizing the Einstein Telescope, including the procedure and criteria for site-selection. A proposal for the necessary ETO funding is prepared and discussed. The European timeline is ambitious and at the same time still uncertain. The Project Office Directorate is therefore in close contact with the ETO Directorate. It is expected that the BGR will present a site-selection procedure by 2024, based on the ETO plans. It has been indicated that the preparation of the above-mentioned items will take time, with submission of the bidbook planned, at least until and including 2026.



BGR

- The site selection procedure;
- The legal entity and statutes;
- The financial framework;
- The Terms of Reference for the decisive interim Council.

ETO

- Technical Design Report
- Site Evaluation Report
- Planning report (phase 2-4)
- Organisation report (phase 2-4)
- Budget and Risk report (phase 2-4)

Scope; ETO design process for the civil engineering

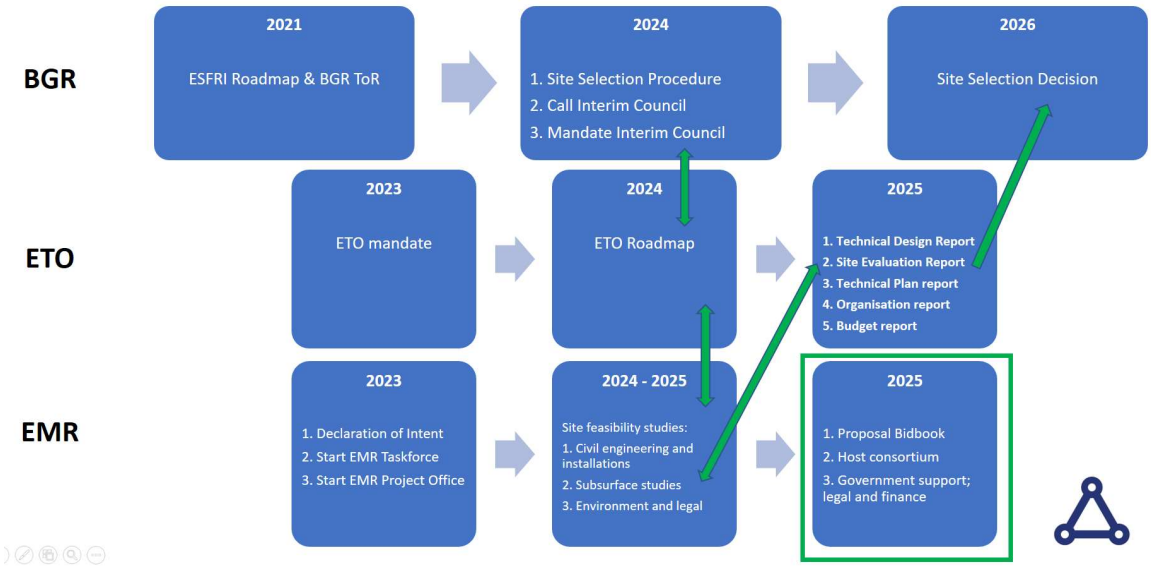
The ETO is responsible for the civil engineering design process. One of the key basic requirements for the design of the Einstein Telescope (L-shape versus triangle) is still under investigation. In the scope of the European Strategy Forum on Research Infrastructures (ESFRI) and NGF application, a triangle configuration was selected as baseline design. For this reason, the Project Office's feasibility study assumes a full-scope Einstein Telescope in the shape of a triangle. The Project Office Directorate is a frequent dialogue with the ETO Directorate to monitor the design process and outcome. The risk of a change in the scope is also included in the register of risks.

The Project Office will present an EMR civil engineering design study following the European requirements. In order to develop the site-specific studies (by the Project Office), it is essential to have timely input from ETO with regard to the functional and operational requirements for the civil engineering. ETO has been requested to clear following aspects as soon as possible:

- setting AACE class 3 as the common standard for the civil engineering design;
- the division and scope of works between the ETO and the EMR Project Office (who will study and design which part; what are the functional requirements for the Project Office parts);
- the ETO systems engineering framework, standards, process and tools;
- the design baseline (ESFRI CDR), the design process (phasing and design changes procedure) towards the TDR and involvement of the EMR Project Office in reviewing;
- the process of site characterisation / evaluation (framework, methodologies, activities, etc.) and the roles of the ETO and the EMR Project Office.

The ETO and the BGR are also anticipating the selection process and the objective comparison/ evaluation of sites. At the moment it is anticipated that the preparations towards a site selection decision will take at least until and including 2026. The ET-EMR Project Office is invited to ensure capacities from the EMR to both progress on the site reports and also engage in delivering the framework, standards, methods and management activities necessary for the site characterisation reports.

Following is an overview of the EMR timeline and the (for now) expected European timelines:



Cooperation between Belgium, Germany, and the Netherlands

Trilateral Task Force

At the ET Ministerial Conference 26 September 2023 in Brussels, delegates from Belgium, the Netherlands and the German Federal State of North Rhine-Westphalia agreed to start preparations for a bidbook and a joint consortium to establish the Einstein Telescope in the Euregion Meuse-Rhine. A Taskforce has been assigned to develop the proposals and present a working agenda. In the collaboration of governments the ET-Ministerial meeting acts as the highest level and a Taskforce acts at the working level. The ET-EMR Project Office is assigned to deliver the feasibility studies leading towards the bidbook. The Project Office supports the Taskforce in delivering the Secretariat. The Taskforce also receives and discusses all quarterly progress reports.

The second meeting of the EMR Taskforce took place on 30 August 2023 in Hasselt. The Taskforce adopted a Terms of Reference, following the tasks as assigned to the Taskforce in the Declaration of Intent as adopted in Brussels 26 September 2023. The Taskforce also has, with consent, taken notice of the plan for the feasibility studies and Q2-2023 progress report. Belgium and Germany were invited to provide for the additional funding, considering the budget constraints and contributions from the Netherlands. It was concluded by the Taskforce that the ET-EMR Project Office directorate and the Steering Group would discuss and present a proposal at the third Taskforce meeting, 20 November 2023 in Maastricht. In the Taskforce meeting of 20 November 2023 the Project Office Directorate has presented the plan and budget proposal 2024-2026, as addressed in a letter to the Taskforce (dated 8 November 2023). The Project Office Directorate stated that a budget decision in the coming 3-6 months would be necessary for the ET-EMR Project Office to start procurement on the additional activities in time (see 6.2 Finances).

Commitment

The Dutch government earmarked funds (€870 million) for the bidbook and realisation in spring 2022 and also made funds (€42 million) available for preparations.

The government of North Rhine-Westphalia (NRW) did announce in January 2023 its intention to co-finance the candidacy, provided federal Germany will do the same. Recently it has been announced that, on the federal level, the German Bundestag will make a budget of (€9 million) available for the feasibility studies; a final approval and the conditions for this budget need to be cleared. The distribution is discussed with the German GW-community. The funding is not to be regarded as a commitment of Germany to the Einstein Telescope project or the EMR candidacy preparations.

The regions, communities, and the federal government in Belgium are now consulting frequently in order to reach a common position. The Interministerial Conference on Science Policy on Einstein Telescope should be understood as a first step in this direction by the Belgian entities. On 22 March 2024, the Flemish government approved its contribution to the financing of the feasibility studies in preparation of the bidbook, i.e. 4 million euro for the period 2024-2026. Discussions on how to use this funding and under which conditions are ongoing. Decisions on additional funding from Wallonia and the Belgian federal government are expected by April or May 2024.

2.2 EMR Project Office organisation

The project roles within the Project Office and following the IPM-model were filled since 2023. The chart below is regularly updated with regard to implementing the IPM-model, the plan 2024-2026 and the desired further internationalisation of the Project Office.

The Project Office

Directorate (client)

• Director	Stan Bentvelsen
• Director	Arjen van Rijn
• Director	Hans Plets
• Senior Strategist (advisor)	Martijn Rumpen
• Communication Manager (advisor)	Henk Schroen

Contractors

• Project Manager	Guid Bartholomée
• Contract Manager	- [3]
• Technical Manager	Wim Walk
• Environment Manager	PM[4]
• Project Control	John Kerstjens

Internationalisation

The signing of the Declaration of Intent 26 September 2023 by the Belgian, German and Dutch ministers clears the international coordinating position of the Project Office with regards to the EMR feasibility studies. The integral plan for the feasibility studies is also an invitation to the Belgian and German governments to participate with manpower and means.

The Project Office continued to implement the IPM-model and the plan 2024-2026. Nikhef and FWO have already agreed to integrate their current project executive capacities in the ET-EMR Project Office. The Project Office Directorate has monthly meetings with the Taskforce Steering Group. A start has been made to come to an agreement with EMR partners on available resources to execute feasibility studies within the (consolidated) plan and budget 2024 – 2026.

There is also direct and frequent contact between the Project Office and contact points of the competent environmental authorities. Periodic consultations on the fields of engineering, the environment (communication and urban planning), and project management have been and will be held with all contact persons. These contacts produce valuable information.

[3] In the current phase of feasibility studies, Project Control also includes Contract Management.
[4] The Project Office Directorate has in 2024-Q1 started the recruitment procedure.

3 Contract management

3.1 Purchasing & Tendering

Tenders through Q1-2024:

Engineering

- Analysis of drilling data Cottessen (and Banholt) completed
  Note: the analysis has been completed; a second opinion will follow.
- Minimum requirements for tunnel, shafts, caverns (tunnelling technology) completed
- 1st Drilling campaign (Flanders, Wallonia, Netherlands) completed
- Borehole measurements completed
- Three component seismic nodes completed
- Civil Engineering (study of alternatives, draft design, cost estimation, logistics plan, register of risks)[1] completed

Environment

- GIS support/support of Landscape design completed
- Pre-planning study completed
- Drilling permits completed
- Private-law study completed

Project organisation Project Office:

- Project control manager completed

General:

- Safety assessment & guidance completed

[1] During the civil engineering tender process, it became clear that additional effort would be needed to achieve the desired level of detail in the design and associated cost estimate (AACE Class 3). The scope of the tender has been adjusted from a product-oriented set-up to one aimed at providing specialists in the various areas who, once awarded, will further develop and deliver the relevant products. This supports also the processing of the ETO input on the civil engineering design.

The following tenders will be prepared/started in Q2-2024:

- Active seismic studies;
- 2nd set boreholes.

Progress reports
The 2023 quarterly progress reports are made available on the website www.einsteintelescope.nl.

4 Technical management

4.1 General

The 2024 activity plan has been operationalised and is being updated based on the first results and experiences from drilling activities that started this quarter.

The E=Mc2 consortium consisting of Tunnel Engineering Consultants (TEC), a permanent joint venture between Royal HaskoningDHV and Witteveen+Bos, the Swiss partners Amberg, Lombardi and the Belgian Tractebel has now been fully integrated in the team to provide a geo-technical perspective on the borehole cores and measurement results, and to develop alternative construction alternatives based on these data.

KNMI has now also been contracted and is expected to play a major role in seismic and noise measuring activities.

This stage of the project focusses on gathering geo-data to characterize the subsurface and de-risk the noise impact and construction costs.

4.2 Technical progress

In Q1-2024, the following progress was made:

Geological model

The initial subsurface model built in 2023 (the Baseline Geological Model) was further updated with new geological data. As a continuous activity, all newly arriving subsurface data are being integrated into a consistent model. A workshop to precisely scope the development and maintenance of an all-data comprehensive 3D model has been planned.

Boreholes

- The detailed planning and logistics of the drilling of the first set of 11 boreholes was finalized and stress-tested during a table (dry-run) discussion at Stump's offices in Solothurn.
- The Core House in Aubel has been equipped with cabinets and instruments to receive, evaluate, and store the core material.
- The first borehole was successfully completed at Hombourg, and the cores have been collected and stored in the Core House in Aubel for evaluation.
- Collaboration with the contracted drilling company (Stump) and the borehole measurement companies (Terratec and SolExperts) was successfully initiated in March and operations are ongoing without major issues and according to time schedule.
- A Safety Inspection of the first drill site was conducted and resulted in no major issues. Smaller issues could all be resolved.

Noise and seismic measurements

- A seismic plan is close to completion and activities are already being organised according to this plan. 400 precise (all-direction measuring) seismic sensors were ordered and have now arrived. They will first be tested and calibrated in collaboration with KNMI. The sensors will then be used for passive seismic and noise measurements.
- A noise measurement plan is also close to finalization. The plan describes the use of boreholes to place seismometers at the bottom of these wells at target depth and how surface measurements using a network of permanent and mobile sensors can be used to estimate the ET noise budget at EMR. This plan also comprises the estimation of the noise from wind turbines; this also relates to the possible mitigating measures.

Civil engineering

- Civil engineering expertise (including an extended back-office) has been integrated successfully in the technical team to develop a risk-based construction model. Alternative construction scenarios will be developed, and the scope of geo-data gathering will be tested and adjusted continuously from a geo-technical perspective. Several paper studies have been started by the back-office using the existing data and using previous reports to develop a baseline for geo-technical evaluation and advice.

Hydrology

A Hydro-geological plan is close to being finalized and hydrological measurements are already currently being set up for the finalized borehole in Hombourg and carried out accordingly. Additional staff to handle this important activity will be contracted.

5 Environmental management

5.1 Urban planning/integration

Integration into the landscape
The ET infrastructure is anticipated to be built almost entirely underground. The feasibility studies are also aimed at positioning the ET infrastructure underground as much as possible and where this is not possible, the integration is carefully designed with respect for nature and landscape. The exploitation phase is considered to have hardly any environmental impact and the construction of the Einstein Telescope is expected to have mainly temporary challenges that require serious attention: partly technical to mitigate effects (sustainable construction and integration) and partly through proper planning. Integration of the landscape is included in the feasibility studies. The legal frameworks, such as Natura 2000 areas, archaeology and monuments, groundwater extraction and protection areas set also clear frameworks for planning and licensing.

The Project Office will also study the options of logistics and construction methods causing as little environmental impact as possible. These include studies on drilling methods; the number of shafts and escape routes; the location where the soil would be transported out of the tunnel; the possible use of the railway for disposal and delivery; the choice of location for the work site; shortening the implementation time, etc. Meetings with stakeholders involved at the Montzen railway emplacement have been initiated to start a study on the feasibility of railway logistics.

Public law aspects

In Q1-2023, the main points of public law procedures relevant to the implementation of the Einstein Telescope were examined in Wallonia, Flanders, and the Netherlands. In order to achieve the desired level of detail regarding the public law procedures required for the Einstein Telescope in Wallonia, Flanders, and the Netherlands, a request for an additional study was prepared by the Project Office in close coordination with the countries concerned. It was observed that in the study, a distinction should be made also in the planning aspects between the German and French Walloon areas. The tender in question is awarded to a Walloon law firm HSP, with as subcontractors a law firm from Flanders (Notius advocaten) and a firm that is familiar with the German-speaking community of Wallonia (Charlotte Mathieu Avocat). The study started in January 2024 and is executed with close supervision of representatives of the Walloon, Flemish and Dutch authorities.

Private law aspects

In addition to public law aspects, private law aspects are also considered, in the present case regarding how to deal with land ownership and land use during construction and during the operation of the tunnel. It turns out that the legal situation in the countries and regions within the search area is not uniform. In cooperation with Hasselt University, among others, an assignment will be drafted in the coming period to obtain further details of these private law aspects.

Geographical information (GIS)

Geographical information, in the form of map layers, makes it possible to conduct analyses and supports the study of alternatives in the search for the most promising location for the Einstein Telescope.
The tender for managing geographical information was completed in Q2. The GIS specialist joined the project team from 1 September 2023; he is setting up the geographic information system, working closely with the development of the subsurface model generated by Engineering.
In Q1 2024 work continued on building up the necessary GIS information. Where information is missing that is important for spatial analyses, efforts are made to obtain this from the various competent authorities (e.g. information about pipeline routes, specific information about Nature 2000 areas, etc.). Information is shared with the parties involved in the civil engineering studies.

Nitrogen

The issue of nitrogen obviously also plays a role in the Einstein Telescope project. Law firm Eubelius has conducted a study on the legal aspects of this subject. The study addresses the impact of the nitrogen regulations applicable in the Flemish and Walloon Regions (Belgium) on the construction and operation of the Einstein Telescope in the search area. As the nitrogen issue is and remains in a state of flux among public authorities, the study will be periodically updated on the basis of advancing insights.

5.2 Preventing undesirable activities

Efforts remain undiminished to prevent undesirable activities (seismic noise vibrations) within the search and protection area in relation to the possible siting of the Einstein Telescope.

<u>Flanders and Wallonia</u>

- Administrative commitments have been received from Flanders and Wallonia regarding the exclusion of subsurface noise in the search and protection area.
- Administrative guidelines have been formulated in that context on how to act in the case of new initiatives. Further legal safeguards are an issue and, for now, it seems that the interests of the Einstein Telescope candidature are sufficiently safeguarded.
- Ongoing initiatives, specifically in Wallonia, have been halted through court rulings. The Belgian State Council has stated against the Walloon Region on 28 March 2023 and cancelled the permit issued in 2021 for a windmill park of 6 wind turbines in Dalhem (ULiège against the Walloon Region, arrêt no 256 du 28 mars 2023). There is a ruling by the Flemish Council of State dated 30 March 2023 regarding annulment of the permit for wind turbines in Dalhem in favour of the interests of the Einstein Telescope. Also a permit for a wind turbine in Visé was cancelled by the Belgian State Council in September 2023.
- The Walloon government has presented a new decree on Mining. Permit applications can be submitted as soon as the decree comes into force. The latter will be no later than 1 July 2024. Extensive mining initiatives in the ET search and buffer area's should be considered incompatible with the EMR candidature ambitions. The ET-EMR Project Office is in contact with the EMR Taskforce and the Walloon representatives to clear the status of possible mining initiatives and the possibilities is also following the explorations of the Walloon government of installing a 'white zone' to prevent new initiatives in the ET search and buffer areas.

North-Rhine Westphalia

- The city of Aachen is planning to replace existing wind turbines and having new ones built. The plans presented include areas in the projected 10 km.-buffer zone surrounding the ET search area. Geothermal energy is also being considered. Both the Dutch science minister and the Provincie Limburg (NL) have since September 2022 asked attention for the ET project and necessary conditions, following the moratorium in the Netherlands and Belgium.
- State Secretary Gonca Türkely-Dehnert has made the following statement during the interministerial conference in Brussels (26 September 2023) : "*Minister Nathanael Liminski has reached an understanding with the mayor of Aachen to the effect that the expansion of wind energy there should not compromise the development of the Einstein Telescope. The huge opportunity provided by the Einstein Telescope are in the shared interest of the entire region and therefore also the City of Aachen*." To complete the feasibility studies and necessary conditioning aspects the Project Office Directorate has requested the NRW Ministries represented in the Taskforce to provide the necessary underpinnings. A round table was organised 16 February between government representatives of North Rhine Westphalia, Cologne district government and the city of Aachen to move forward on the agreement that the expansion of wind energy should not compromise the development of the Einstein Telescope
- At the end of 2023 there was an application for a permit to exchange an existing wind turbine in the German part of the protection zone. There was a response by the Province of Limburg (NL), advising not to give the requested permit considering the conflict of interest within the Einstein Telescope 10 km.-buffer zone.

The Netherlands

As a result of the moratorium, introduced by the Province of Limburg ordinance, competing activities are no longer possible. It is forbidden to realise new wind turbines. Mining and excavations are only allowed if they do not hinder the Einstein Telescope.

5.3 Research on mitigation measures

The Task Force has requested the ET-EMR Project Office to act as the initiator and client for research on the impact of wind turbines on the Einstein Telescope and the potential of mitigation measures. Nikhef, RWTH, ULiège, KU Leuven and Hasselt University are collaborating to execute this studies. Execution of the research activities have started in Q1-2024 and integration is expected by 2024-Q2.

Other noise sources

In parallel with the study on the impact of wind turbines and mitigation measures, a study on the potential impact of mining, excavation, railways, and geothermal sources on the Einstein Telescope and possible mitigation measures is also being taken up by the Project Office. A plan for these studies is in preparation.

5.4 Stakeholder management

Preparing studies/activities

In preparation for the various drilling campaigns and studies in the search area, Environmental Management is in contact with the relevant stakeholders, in preparation for the permit applications to be submitted. These include meetings with the involved municipalities. This is also contact with the German community in Belgium considering the plans for subsurface studies in that area.

State supervision - State Supervision of Mines and Mining Advisory Council

After an initial consultation with representatives of the Netherlands' State Supervision of Mines (SSM), resulting from the advice of the National Growth Fund, had taken place in Q1-2023, SSM and the Ministry of Economic Affairs and Climate Policy looked into the legal position of SSM.
Based on this initial exploration, it was concluded that SSM would have no legal role in the ET project, as the aim of the project is scientific in nature and not aimed at minerals extraction. However, SSM has substantial experience of work underground and the ET will operate in the ground. There will be further discussions with the Ministry of Economic Affairs and Climate Policy and SSM on what is desirable and what is legally possible, or can be made possible, in order for SSM to be involved in the project in some way. The Mining Advisory Council has declared not to have a role in the project. In parallel, state supervision will also be discussed at international level.

5.5 Regional communication

Q1 2024 was mainly dominated by the (communicative) preparations for the drilling campaign, which started in March. In addition, the eight public meetings were central to the communicative calendar. In February and March 2024, eight public meetings were organised in municipalities in the search area: three in Wallonia (Montzen, Aubel and Gemmenich), two in Voeren and three in Dutch Limburg (Vaals and twice in Epen). Five of the initially seven meetings were fully booked a week before the start. For that reason, an additional, eighth meeting was added in March. In total, the public meetings were attended by about 700 interested people.

The purpose of those meetings was twofold. On the one hand, to inform about the Einstein Telescope, about the task of the project office and about the upcoming drilling campaign. In addition, through thematic table discussions, the project office wanted to take a first exploratory step towards a future participation process. In general the atmosphere during these meetings was very positive, with the public showing a genuine interest in the project. In a description on the project office's website and via social media, the results were fed back to visitors and other interested parties.

Agreements were made with GréLiège, the Walloon partner for the Project Office, on communication efforts to raise awareness of the Einstein Telescope in Wallonia.

In order to create or increase impact at European level on a strategic and diplomatic level, consultations were held with (communication departments of) the Dutch Ministries of Education, Culture and Science and of Economic Affairs and Climate on the more organisational and communicative details and support for this.

5.6 Sustainability

Led by Nikhef and the Maastricht Sustainability Institute, a working group has carried out an initial survey of a wide range of sustainability aspects in general terms in relation to the entire cycle of the Einstein Telescope project; this is done in the context of the ET Technologies project. In Q2-2023, preparations were made to further address and focus on the sustainability/environment/landscape theme in cooperation with Hasselt University, partly on the basis of this initial survey, and to tailor it to the feasibility study.

The aspect of sustainability is an integral part of the work packages within both the field of technology and the field of environment. Sustainability is a subject in civil design, implementation methods, logistics during construction and operation, as well as in subjects such as landscape integration, energy consumption and energy supply, in which the possibility for innovation is always examined.

Logistics
The logistics surrounding the handling of large quantities of materials excavated from the subsurface, combined with the delivery of construction materials and the location of the work site, are the subject of the feasibility study. As more information is acquired on this, it turns out to be one of the most important research topics.
Discussions are taking place with Infrabel-NMBS about possible options relating to rail logistics and the use of the railway yard at Montzen in this regard. It is also being discussed with the Walloon and federal governments. It will become clear over the coming period to what extent there will be opportunities here.

6 Project control

6.1 General

A number of operational management and project control topics are dealt with in the field of Project Control. These topics focus on facilitating the Project Office and the managers of the specialist fields, guiding processes, monitoring the goal of the feasibility study, and managing risks.

6.2 Finances

Plan and budget 2024-2026

The Taskforce has, with consent, taken notice of the plan for the feasibility studies at its meeting 30 August 2023 in Hasselt. On 30 August 2023 it was concluded by the Taskforce that the Project Office directorate and the steering group would discuss and present a proposal at the next Taskforce meeting. Considering the contributions from the Netherlands, Belgium and Germany were invited to provide for the additional funding for the feasibility study.

The Project Office prepares to deliver a civil engineering design and cost overview, according to AACE Class 3 standards. This will provide an accuracy range (between -20% and +30%) for the civil engineering works. The Project Office Directorate requested the Taskforce and Governments to provide further means necessary, considering the following:

- Consultations with civil engineering and geology experts have proven that to deliver the required AACE Class 3 design and budget will require an additional effort in both the civil engineering design and the necessary subsurface studies. This also includes a proposal to provide research on the impact and mitigating measures of wind turbines.
- The European ETO Directorate has announced to develop a plan of action, anticipating AACE Class 3 standards. Estimates are made that it will take at least until 2026 for the preparations to the site decision; additional time and inflation are included in the budget.
- Consultations with EMR stakeholders have proven a need for additional efforts in environmental studies, stakeholder management and communication.

To execute the plan requires a total budget of 49 M€. The Project Office has been provided with 25 M€ in funding by the Government of the Netherlands (23 M€) and the Province of Limburg of the Netherlands (2 M€). The Project Office Directorate therefore requested the Governments for the additional funding of 24 M€. On 22 March 2024, the Flemish government approved the requested funding from Flanders, i.e. 4 million euro for the period 2024-2026.

IPM-discipline	Current [1]	Proposed [1]	Delta [1]	Justification/explanation	Current [1]	Proposed [1]	Delta [1]
Projectmanagement	**2**	**3**	**1**				**1**
Contractmanagement	**0**	**0**	**0**				**0**
Technical management	**18**	**38**	**20**	Civil Engineering AACE Class 4 -> AACE Class 3	**1**	**11**	**10**
				More boreholes / borehole measurements	**9**	**15**	**6**
				More intensive active seismic campaign	**3**	**5**	**2**
				Additional Noise studies	**1**	**2**	**1**
				Organisation / other	**4**	**6**	**2**
Environmental management	**3**	**6**	**3**	Additional Communication cost / Logistic study AACE Class 4 -> AACE Class 3	**3**	**6**	**3**
Project Control	**2**	**2**	**0**				**0**
Total	**25**	**49**	**24**				**24**

[1] amounts * 1 million

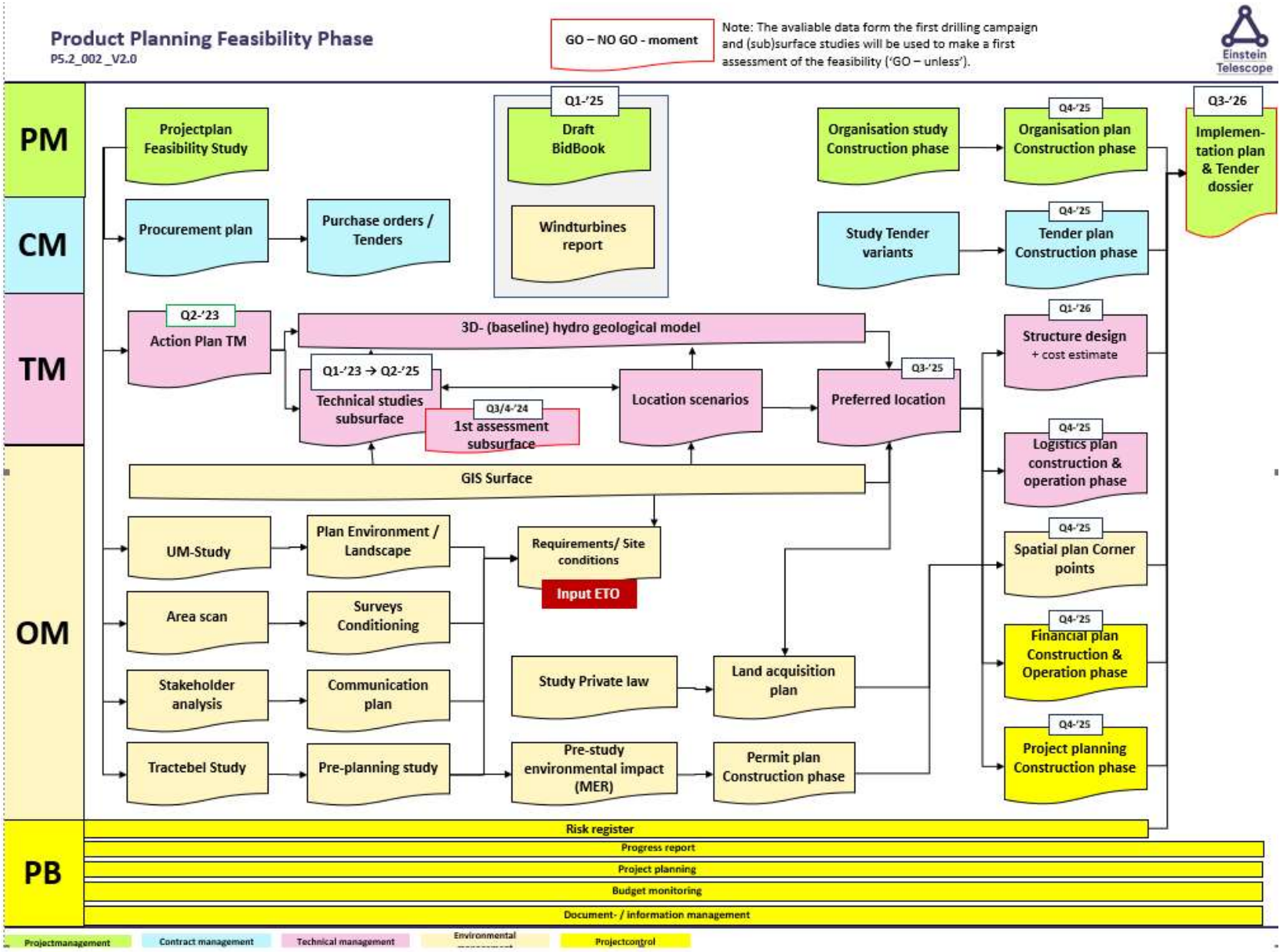
In the Taskforce meeting of 20 November 2023 the Project Office Directorate has presented the plan and budget proposal 2024-2026, as addressed in a letter to the Taskforce (dated 8 November 2023). The Project Office Directorate stated that a budget decision in the coming 3-6 months would be necessary for the ET-EMR Project Office to start procurement on the additional activities in time. There is contact between the Project Office Directorate and representatives of the governments to validate the funding and necessary conditions. An informative meeting between Project Office and (funding) representatives of the regional funders has been held in Brussels on 28 March.

6.3 Schedule

Following the message from the European ETO organisation, the delivery of the bidbook is expected for earliest in 2026. This poses the risk of a 'Longer lead time'. The consequences for both the schedule and the budget have been incorporated into the updated project schedule (Annex 1) and budget.

The first assessment of the subsurface is expected in Q3/Q4-2024 instead of Q2-2024.

The diagrammatic representation of the product planning (see next page) has also been updated based on the latest information.


Product Planning Feasibility Phase
P5.2_002 _V2.0
GO – NO GO - moment
Note: The avaliable data form the first drilling campaign and (sub)surface studies will be used to make a first assessment of the feasibility ('GO – unless').
Einstein Telescope
PM
CM
TM
OM
PB
Projectplan Feasibility Study
Procurement plan
Purchase orders / Tenders
Q1-'25
Draft BidBook
Windturbines report
Organisation study Construction phase
Q4-'25
Organisation plan Construction phase
Study Tender variants
Q4-'25
Tender plan Construction phase
Q3-'26
Implementation plan & Tender dossier
Q2-'23
Action Plan TM
3D- (baseline) hydro geological model
Q1-'23 → Q2-'25
Technical studies subsurface
Q3/4-'24
1st assessment subsurface
Location scenarios
Q3-'25
Preferred location
Q1-'26
Structure design
+ cost estimate
Q4-'25
Logistics plan construction & operation phase
GIS Surface
UM-Study
Plan Environment / Landscape
Requirements/ Site conditions
Input ETO
Area scan
Surveys Conditioning
Stakeholder analysis
Communication plan
Study Private law
Land acquisition plan
Tractebel Study
Pre-planning study
Pre-study environmental impact (MER)
Permit plan Construction phase
Q4-'25
Spatial plan Corner points
Q4-'25
Financial plan Construction & Operation phase
Q4-'25
Project planning Construction phase
Risk register
Progress report
Project planning
Budget monitoring
Document- / information management
Projectmanagement
Contract management
Technical management
Environmental
Projectcontrol

6.4 Quality

To ensure quality, a start was made on setting requirements. The requirements encompass:

- The process of preparing and submitting a compelling bidbook;
- The process of meeting the terms of the NGF grant decision;
- The Einstein Telescope system (below and above ground);
- The temporary system serving the construction of the Einstein Telescope.

The timely input from the European ET organisation ETO is crucial:

- Baseline design detector;
- Demarcation of the system breakdown structure between ETO and ET-EMR/TETI.
- Functional requirements for infrastructure and above surface facilities;
- Change procedure.

6.5 Risks

The risk management process is carried out using the RISMAN method, which is widely used for construction and infrastructure projects characterised by high complexity, many stakeholders with diverging interests, and uncertainty about costs and lead times due to planning procedures.

The steps in this cyclical process are:

- Identifying (based on the IPM structure and underlying processes);
- Quantifying (assessing risks for probability of occurrence and potential impact on Time, Money, Quality, the Environment, Image, and Safety);
- Establishing management measures;
- Implementing and evaluating management measures;
- Updating risk.

Based on the inventory of March 2023, the follow-up process was given form and content in Q2-2023. Below are the risks that were specifically addressed in 2024-Q1:

Risk	**Management**
Co-financing entities have diverging views on what is needed for the bidbook.	Careful scrutiny by Project Office, based on expert advice, of propositions from co-funding entities
Subsurface noise; plans for wind turbines, mining activities and geothermal energy in the protection area could emerge.	We monitor the conditions. The Taskforce is provided with the information to discuss the conditioning aspects. A study on mitigating measures will be carried out. We refer to paragraph 5.2 for the current situation.
Longer lead time because of, e.g.,	

• deliverables from ETO • decision-making in various countries • subsurface studies	Monitor ETO closely Intensive coordination within Task Force Carry out studies simultaneously Planning and budget have been adjusted based on the indication from ETO.
Stress on budget	Manage costs Additional cover (partners) is proposed; see paragraph 6.2.
No scientific consensus on the shape of the Einstein Telescope (triangle versus L). Unstable scope ETO – ET Collaboration (optical design, detector design, design- and operational requirements)	Focus on current scope as adopted by ESFRI and NGF (triangle); Monitor development closely; Establish a formal framework and information exchange between the ETO and Project Office directorates. Put on the agenda for the ETO directorate – PO directorate meeting.

6.6 Information management

Document management/control information

After the system for archiving, document management (SURFdrive) and project information was set up and put into operation since Q1-2023, it is structurally and systematically filled from Q2 onwards, so that this information is available to the members of the Project Office.

6.7 Facilities

Based on the action plan and in consultation with the managers of the specialist fields, it will be ensured that appropriate staffing of the Project Office; accommodation; integrity and social safety protocols in the workplace; insurance cover; complaints protocol, etc., are in place.
These issues were successively addressed during the first half of 2023.

Annex 1 Project planning