


# Port Talbot

Light Pollution Study

15 July 2024

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## 1. Executive Summary

The purpose of this report is to present a pre- liminary study of the baseline conditions with regards to light spillage from Tata Steel UK Ltd in Port Talbot, Wales.

The study includes the identification of sensitive receptors and the results from a site survey to record illuminance levels.

## 2. Sensitive receptors

An initial review of the area was undertaken in order to identify areas relevant sensibility to light pollution.

Three areas were identified due to sensitive wild- life (marked in blue in fig. 1), particularly bats:

Areas 1: Eglwys Nunydd Reservoir.

Area 2: Internal reservoir.

Area 3: Green area with fields, trees and bushes, and featuring an access road (Healcaeir-Bont) and a path (Lower Mother).

This review also showed that all residential areas in the area are too far from the site to be significantly adversely affected by light spillage.

## 3. Assessment

A nighttime site survey was undertaken in June 2024 between 11pm on 26th and 2am on the 27th. The weather conditions were overcast and dry, which implies low ambient light in spite of the moon being between the second and third quarters. It is considered that this was a standard operating evening and as such that light levels would be typical.

A number of reading locations were selected (Points 1 to 27 in fig. 1), chiefly along the perimeter of the sensitive Areas, but also within Area 3 along Healcaeir-Bont Road (Points 4 to 8) and Lower Mother path (Points 17 and 18).

## 4. Results

The results for Area 1 show an average value is 0.21 lx, with a standard deviation of 0.1 lx and a maximum of 0.45 lx.

Area 2 showed the most relevant recordings in the survey. The average illuminance was 4.8 lx, with a standard deviation of 5.2 lux and a maxi- mum of 18.1 lx. The highest values were record- ed along the eastern boundary (Points 19 to 22, and 27) looking primarily east and away from the Area.

Results along the access path in Area 3 (points 4 to 8) showed an average illuminance of 0.31 lux, with a standard deviation of 0.24 lux and a maximum of 1.07 lx. It should be noted that measurements Points 17 and 18 were not possible due the excessive vegetation.

The perimeter of Area 3 showed low values in general, apart from Point 11. This Point received a maximum of 10.3 lx from the southwest, whilst for the rest of points (9-10



Figure 1: Sensitive Areas and Reading Locations

| PORT TALBOT EXTERNAL PLANT LIGHTING SURVEY(LUX Levels) |                                                   |            |                  |       |       |       |             |          |
|--------------------------------------------------------|---------------------------------------------------|------------|------------------|-------|-------|-------|-------------|----------|
| Carried out by <b>M. Waldram</b> (Tata Steel Projects) |                                                   |            |                  |       |       |       |             |          |
| DATE: 23:00 26-06-24 to 02:00 27-06-24                 |                                                   |            |                  |       |       |       |             |          |
| WEATHER CONDITIONS                                     |                                                   |            | Overcast and dry |       |       |       | Grid Coords |          |
| Point                                                  | Time                                              | Horizontal | Lux Levels       |       |       |       | North       | West     |
|                                                        |                                                   |            | North            | East  | West  | South |             |          |
| 1                                                      | 23:00                                             | 0.23       | 0.27             | 0.07  | 0.16  | 0.16  | 51.33.19    | 03.44.41 |
| 2                                                      | 23:10                                             | 0.2        | 0.27             | 0.13  | 0.24  | 0.12  | 51.33.14    | 03.44.49 |
| 3                                                      | 23:15                                             | 0.2        | 0.35             | 0.17  | 0.45  | 0.19  | 51.33.11    | 03.44.48 |
| 4                                                      | 23:40                                             | 0.32       | 0.97             | 1.07  | 0.14  | 0.25  | 51.33.15    | 03.45.04 |
| 5                                                      | 23:45                                             | 0.21       | 0.28             | 0.16  | 0.14  | 0.09  | 51.33.12    | 03.45.12 |
| 6                                                      | 23:51                                             | 0.25       | 0.29             | 0.23  | 0.21  | 0.19  | 51.33.10    | 03.45.22 |
| 7                                                      | 23:57                                             | 0.24       | 0.36             | 0.35  | 0.24  | 0.14  | 51.33.06    | 03.45.32 |
| 8                                                      | 00:00                                             | 0.24       | 0.59             | 0.34  | 0.41  | 0.2   | 51.33.04    | 03.45.38 |
| 9                                                      | 00:08                                             | 0.49       | 0.95             | 0.1   | 0.12  | 0.79  | 51.32.57    | 03.45.32 |
| 10                                                     | 00:45                                             | 1.05       | 1.4              | 0.14  | 2.15  | 0.89  | 51.33.06    | 03.45.59 |
| 11                                                     | 00:49                                             | 5.25       | 1.35             | 0.29  | 10.27 | 7.05  | 51.33.08    | 03.46.00 |
| 12                                                     | 01:20                                             | 0.35       | 0.31             | 0.21  | 0.39  | 0.46  | 51.33.14    | 03.46.00 |
| 13                                                     | 01:22                                             | 0.36       | 0.89             | 0.67  | 0.72  | 0.14  | 51.33.22    | 03.45.59 |
| 14                                                     | 01:25                                             | 0.38       | 0.61             | 0.32  | 0.45  | 0.34  | 51.33.19    | 03.45.42 |
| 15                                                     | 01:31                                             | 0.28       | 0.71             | 0.57  | 0.56  | 0.11  | 51.33.19    | 03.45.31 |
| 16                                                     | 01:28                                             | 0.41       | 1.01             | 0.52  | 0.92  | 0.21  | 51.33.19    | 03.45.26 |
| 17                                                     | Unable to gain access due to excessive vegetation |            |                  |       |       |       |             |          |
| 18                                                     | Unable to gain access due to excessive vegetation |            |                  |       |       |       |             |          |
| 19                                                     | 01:10                                             | 7.43       | 5.6              | 13.14 | 4.28  | 4.37  | 51.33.50    | 03.46.13 |
| 20                                                     | 01:13                                             | 8.49       | 3.95             | 18.05 | 1.25  | 5.59  | 51.33.45    | 03.46.17 |
| 21                                                     | 01:37                                             | 9.24       | 8.87             | 3.85  | 18.09 | 0.98  | 51.33.43    | 03.46.20 |
| 22                                                     | 01:39                                             | 14.96      | 1.54             | 17.65 | 3.68  | 2.87  | 51.33.42    | 03.46.23 |
| 23                                                     | 01:42                                             | 0.65       | 1.39             | 0.93  | 0.41  | 1.21  | 51.33.42    | 03.46.29 |
| 24                                                     | 01:45                                             | 0.5        | 1.84             | 0.77  | 1.26  | 0.66  | 51.33.48    | 03.46.36 |
| 25                                                     | 01:00                                             | 0.29       | 3.45             | 1.03  | 0.65  | 0.7   | 51.33.50    | 03.46.36 |
| 26                                                     | 01:05                                             | 0.75       | 1.36             | 1.96  | 0.56  | 0.97  | 51.33.55    | 03.46.27 |
| 27                                                     | 01:07                                             | 3.82       | 12.32            | 6.45  | 10.65 | 9.75  | 51.33.54    | 03.46.16 |

Figure 2: Reading Values

NOTE: Horizontal reading is with sensor facing upwards.  
Readings taken approx 1m from ground level

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# Baseline photography methodology

The following photography has been undertaken in accordance with TGN 07/19 and the developing understanding of night-time photography, published by the Landscape Institute.

## PHOTOGRAPHY & SURVEYING

All photographs were taken with a Nikon Z7ii full frame professional camera and lens combination. The choice of lens length was determined based on the viewpoint distance from the proposed EAF development. The aim was to capture enough of the site within it's context. Either a 24mm or 50mm lens was used.

The position of each camera location was surveyed using a Leica GS16 GNSS Smart Rover Antennae which can capture Eastings and Northings and height (in metres Above Ordnance Datum) along with a CS20 data controller and recorder to display the antennae point location down to cm accuracy.

A sturdy Manfrotto ..... tripod was used to mount the camera. The Leica GS16 Smart Rover antennae was first mounted to the camera for the location to be recorded. The tripod was then positioned according to pre-provided GPS co-ordinates as closely as possible. Once in position, the antennae was removed, and the camera level was fine tuned using a three-way levelling base and inclinometer. The camera was set with the centre of the lens at 1.60m above ground level. Camera settings were set to Manual mode to allow full control over aperture and shutter speed. ISO was fixed at ISO 100, and an aperture of f/8 was used while sunlight was still available. The aperture was gradually opened in conjunction with a slower shutter speed as light levels dropped. Care was taken not to reduce the shutter speed to far, due to windy conditions and billowing steam stacks on site, which would have created blurry and confusing shapes within the images.

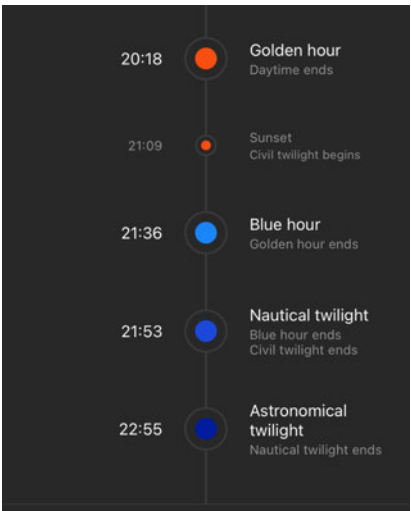
The 5x viewpoints were captured in July under favourable conditions.



Manfrotto tripod with  
GS16 antennae



Three-way levelling base  
and inclinometer



Photopills information showing  
natural light stages on 17 July 2024

## VIEWPOINTS & METHOD

Scottish Natural Heritage 2017 guidance on *Visual Representation of Wind Farms*, has suggested that approximately 30mins after sunset provides the most reasonable balance between visibility of form and the brightness of artificial lights, when considering night-time photography and photomontage.

Using a photography planning app (<https://www.photopills.com/>) to determine the golden hour, sunset, dusk (blue hour) and twilight time for each night of photography, times were calculated to capture a series of shots at roughly 20-30 minute intervals as a bracket around sunset time and the recommended 30 minutes after sunset.

Each viewpoint required 9x photographs to capture the passage of natural light from the end of day through sunset, dusk, twilight and then night-time. During the time of shooting in July, shots were taken from roughly 2015 hours through to 2330 hours.

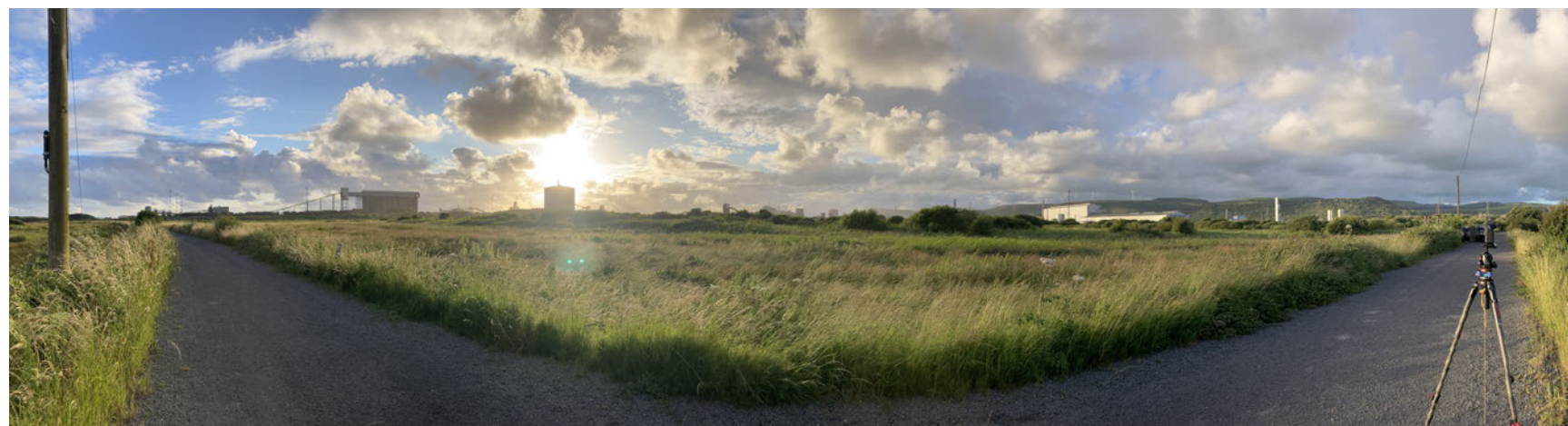
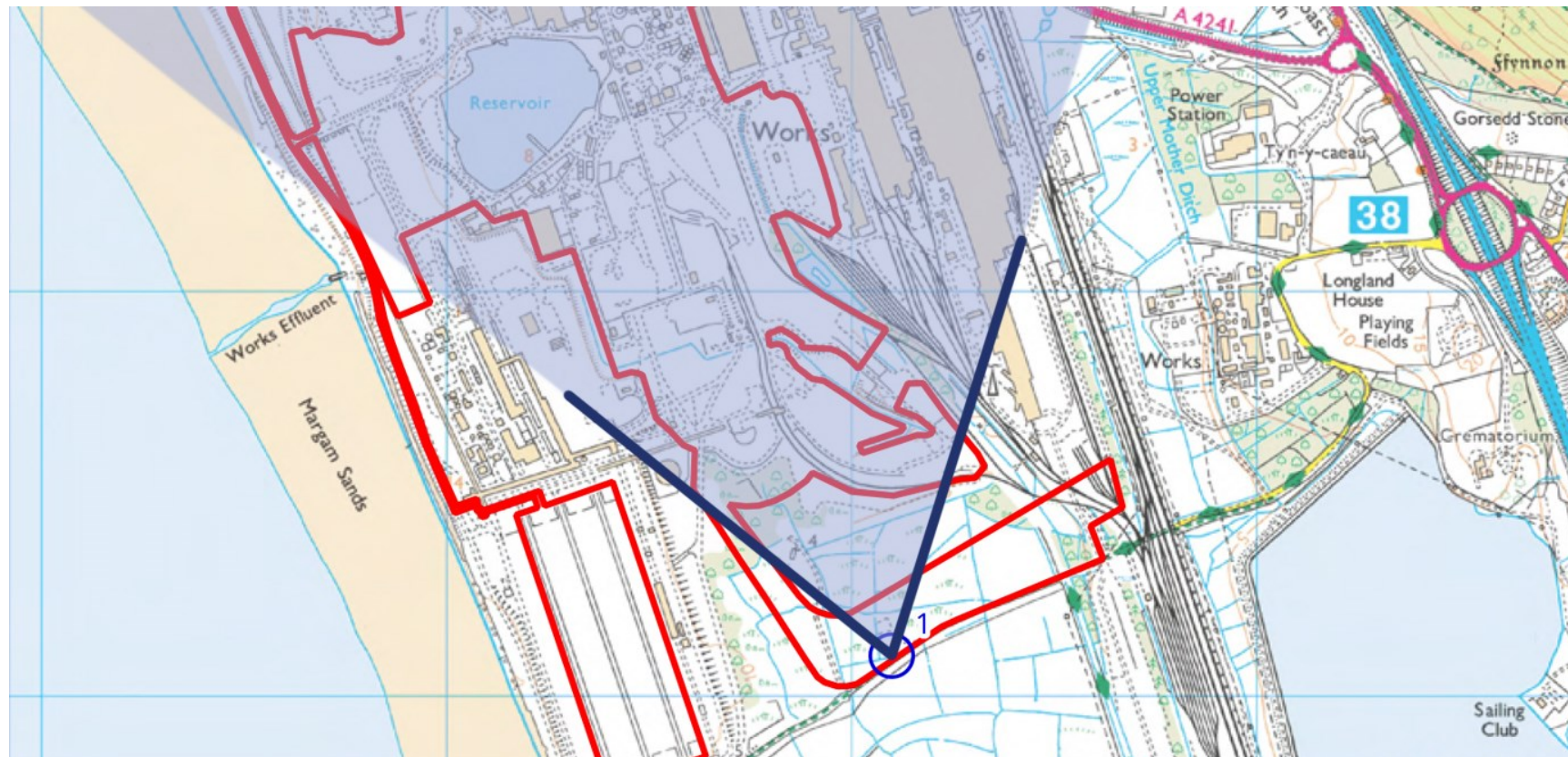




## VIEWPOINT 1, LONGLANDS LANE

278250.3875m (E), 185189.2581m (N), 4.7759m (AOD)

6 JULY 2024





















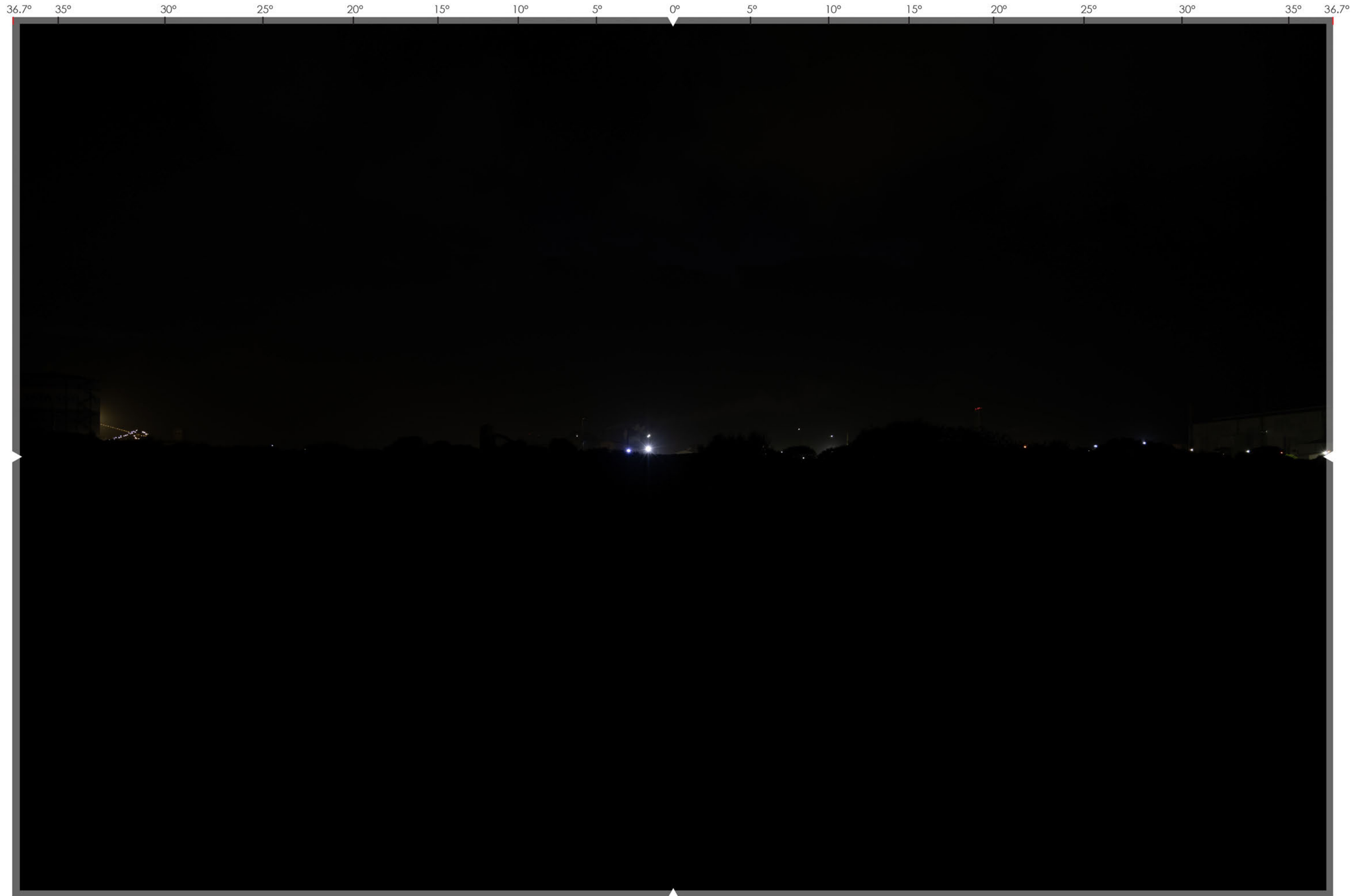






36.7° 35° 30° 25° 20° 15° 10° 5° 0° 5° 10° 15° 20° 25° 30° 35° 36.7°







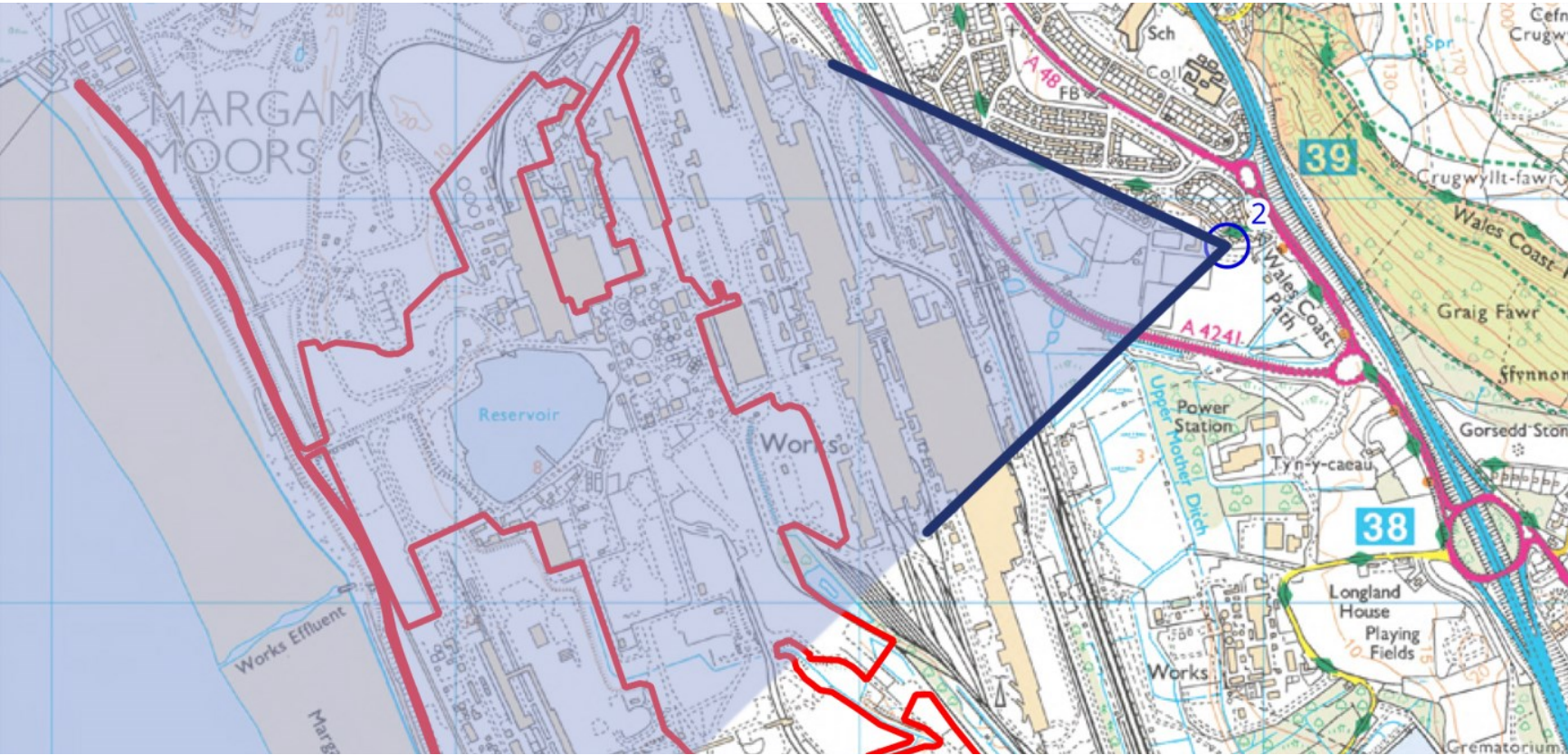




VIEWPOINT 2, ABBOTS CLOSE, MARGAM

278900.6560m (E), 186867.2878m (N), 6.8647m (AOD)

10 JULY 2024





















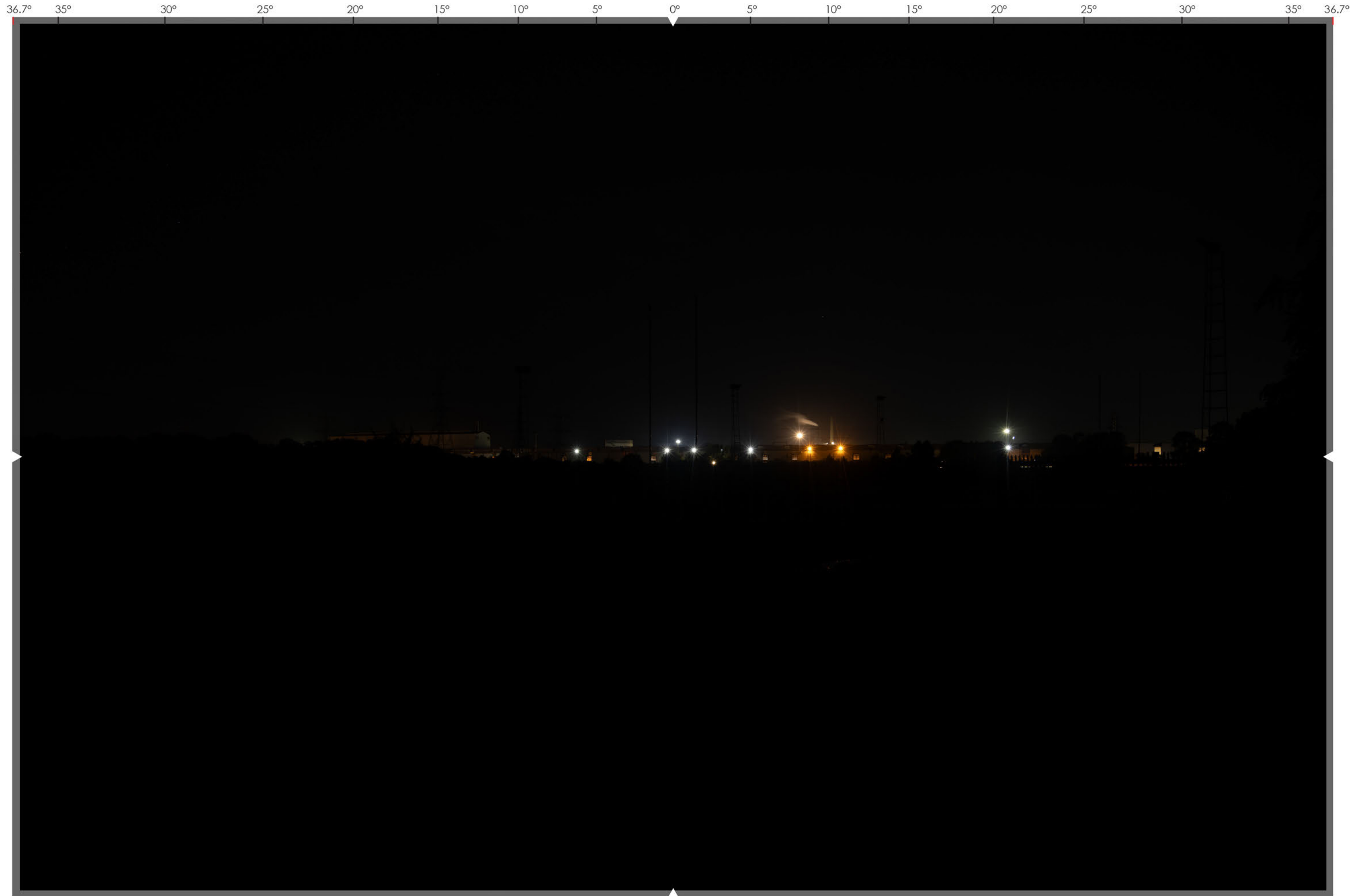




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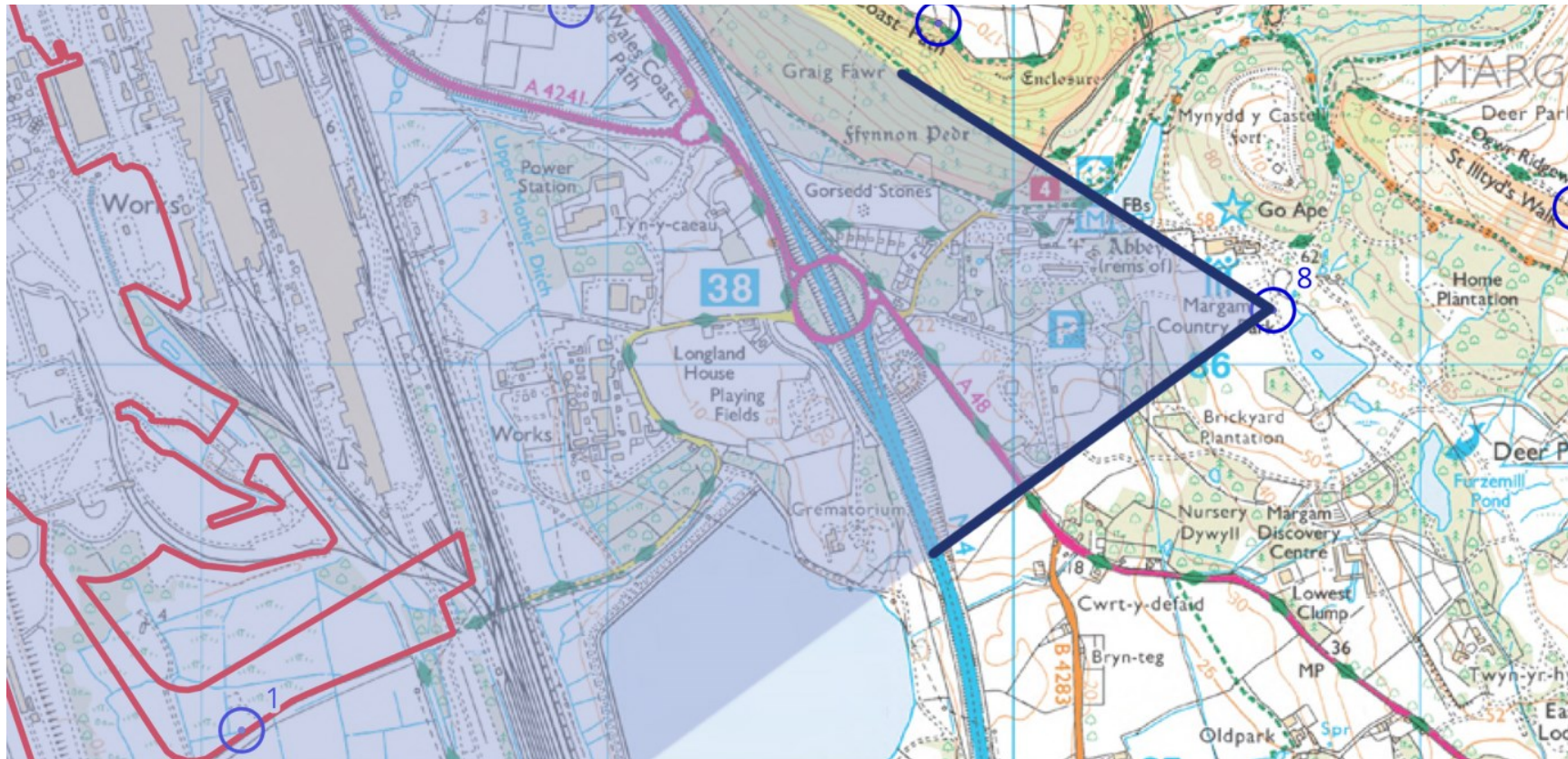
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17 JULY 2024























19.8° 15° 10° 5° 0° 5° 10° 15° 19.8°

















## VIEWPOINT 13, KENFIG NATURE RESERVE

279982.8673m (E), 181090.9291m (N), 24.3846m (AOD)

07 JULY 2024























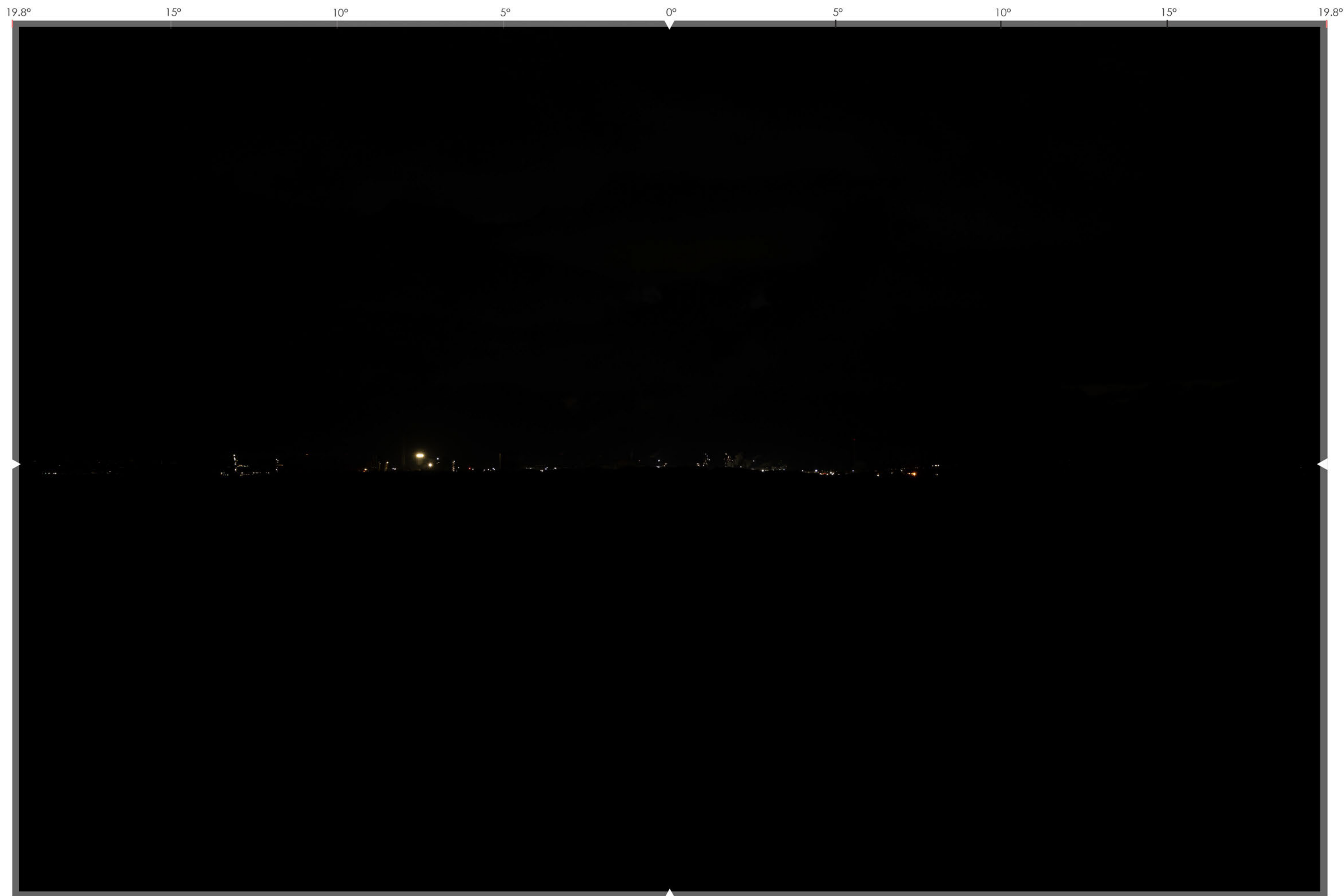




















## VIEWPOINT 21, MUMBLES HILL

262649.0774m (E), 187395.3324m (N), 65.0803m (AOD)

11 JULY 2024















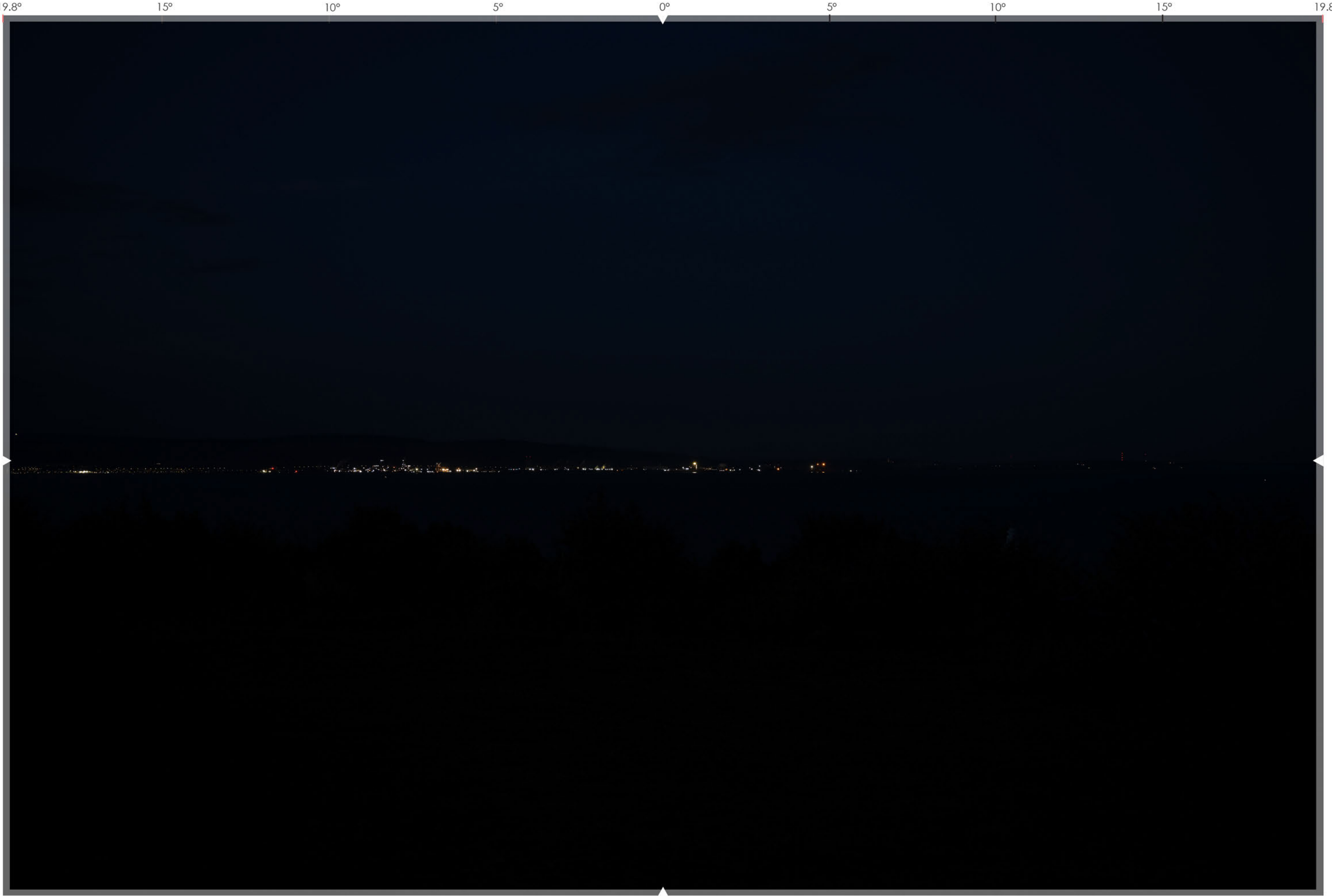




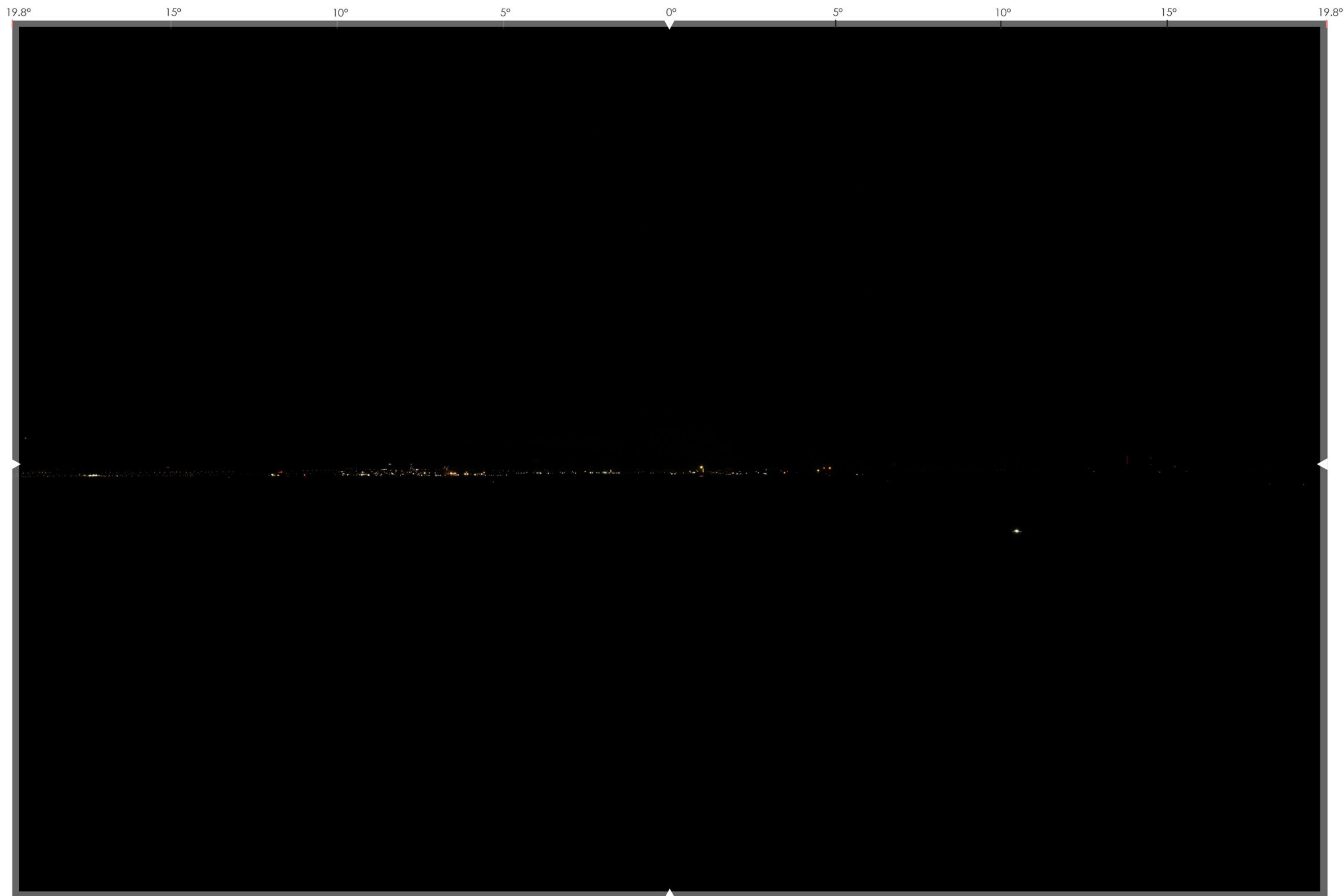




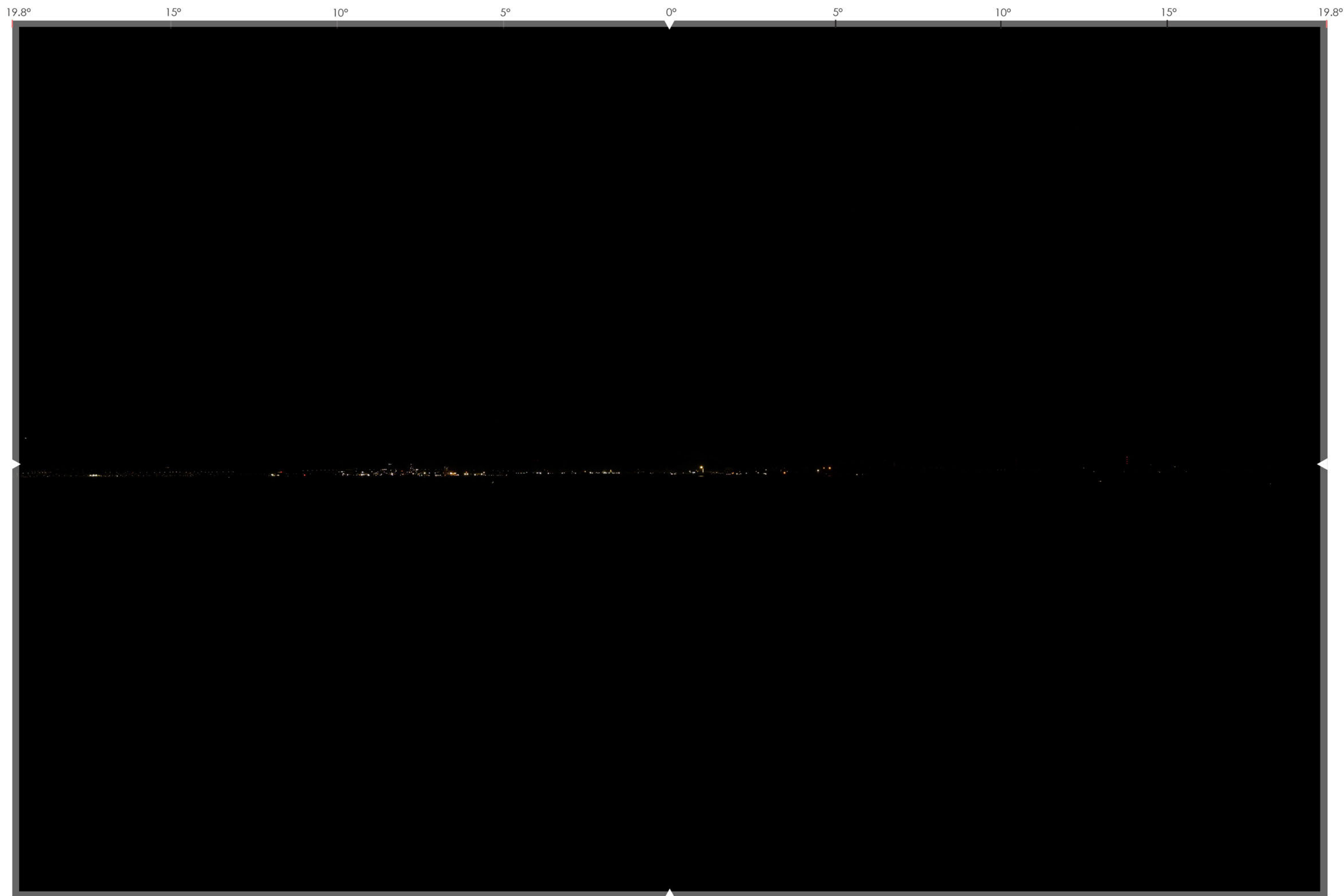




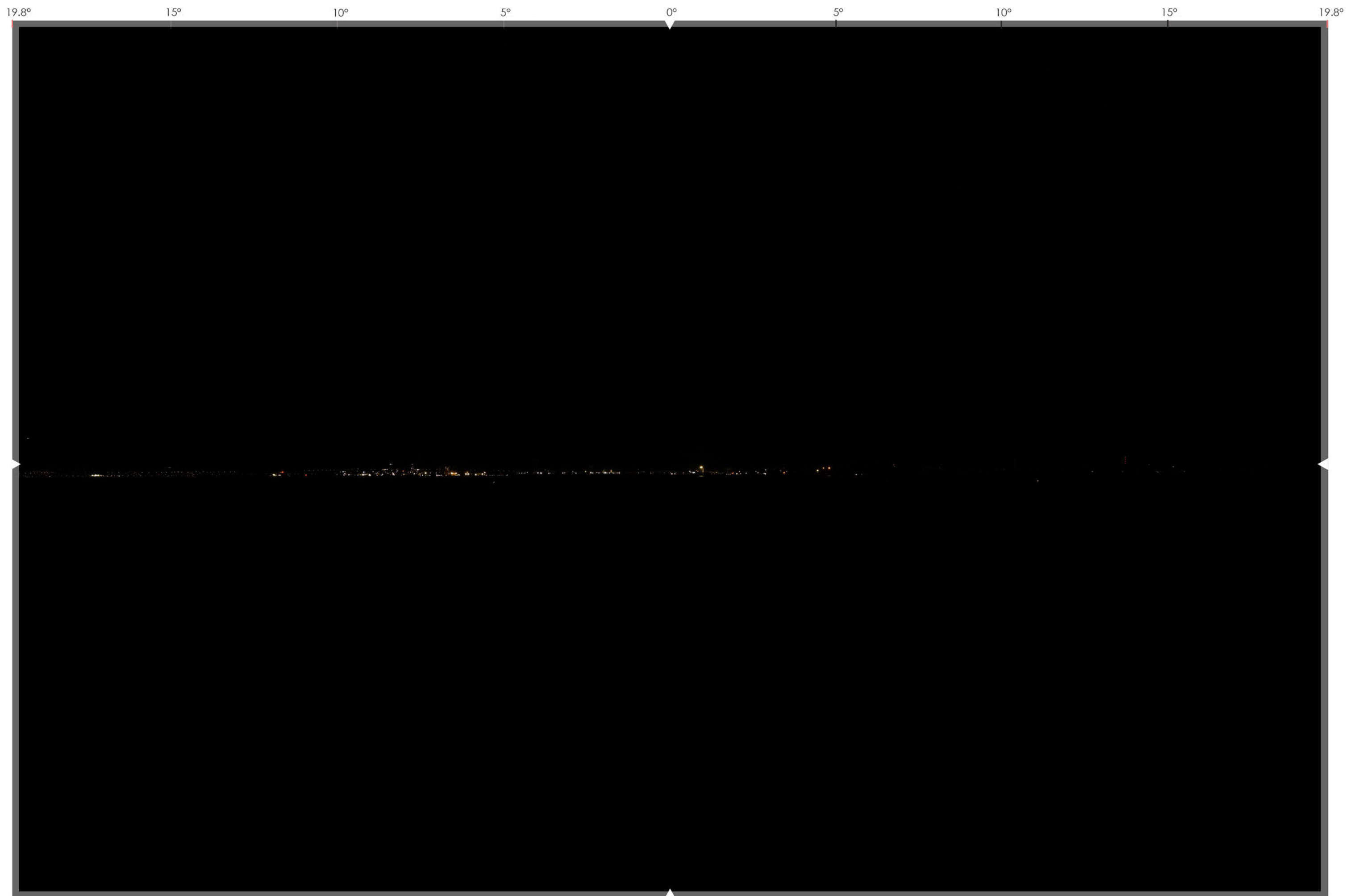
















## Night-time photomontage methodology

### 3D MODELLING

Lawray Architects provided a geo-referenced 3D Autocad model of the proposed scheme and a 3D topographic model of the existing landscape terrain, also geo-referenced.

The proposed lighting model was constructed from the TCE lighting layouts for the proposed site, including details on luminaires to be modelled and which IES files should be used. This lighting model was then geo-positioned to a TCE site plan of the proposed layout, before being merged into the same 3D file with the Lawray 3D model.

### CAMERA MATCHING

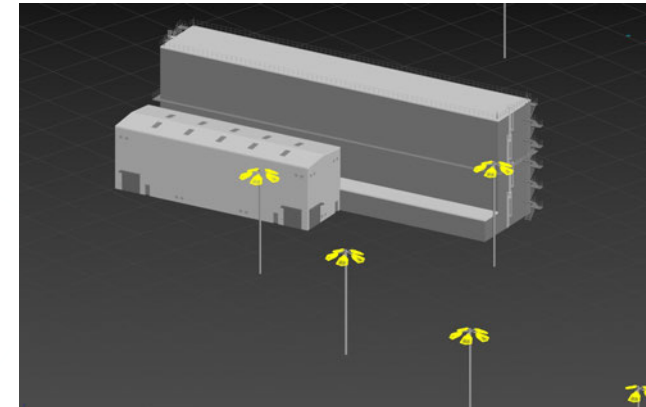
In 3dsMax, we positioned 5x virtual cameras using the surveyed GPS data of our camera viewpoint. Each virtual camera can replicate precisely the camera and lens settings used in the real world cameras. The virtual cameras were configured to mimic each of the 5x viewpoint's lens settings, ISO and shutter speed.

In order to correctly align each camera to each of the 5x viewpoint photos, a series of 'visual aids' were extruded from building footprints of buildings that were also present within each of the 5x viewpoints. To determine the height of the extrusions generated from these building footprints, rough AOD measurements were taken from Google Earth views of the existing steelworks site. Site sections were also utilised to align the Canopy Hood Building over the visible existing BOS plant. Using this method, we were able to develop a good alignment between our virtual camera, and the photographic view.

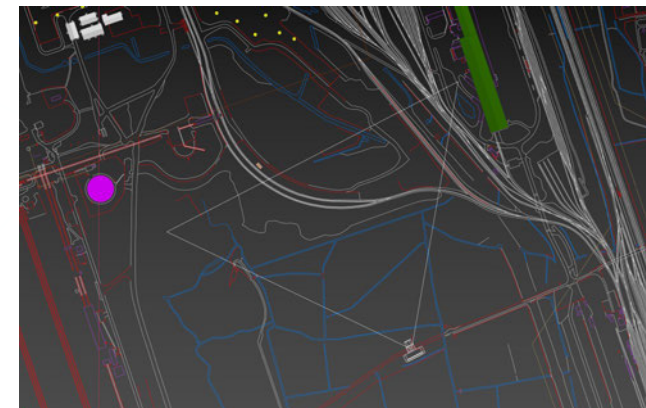
### 3D RENDERING & PHOTOMONTAGE

IES luminaire files were sourced from Philips, as specified by TCE in their lighting calculation report and product data sheets. 3D renders were generated using Corona for 3dsMax. Renders were created using a virtual camera copying real world camera settings, along with IES files that reflect the actual luminaire dimensions, lumens power and temperature colour. This approach to rendering means that the operator makes no additional input to manipulate the outcome of the rendered image.

Finally, the rendered images were overlaid with the viewpoint photo in Photoshop and masking was added to hide the render behind blocking foreground elements such as treelines or existing buildings.



3D model with IES lights



Geo referenced virtual camera and massing visual aids



Close up of render superimposed over VP1 image without masking



























36.7° 35° 30° 25° 20° 15° 10° 5° 0° 5° 10° 15° 20° 25° 30° 35° 36.7°









36.7° 35° 30° 25° 20° 15° 10° 5° 0° 5° 10° 15° 20° 25° 30° 35° 36.7°





36.7° 35° 30° 25° 20° 15° 10° 5° 0° 5° 10° 15° 20° 25° 30° 35° 36.7°







36.7° 35° 30° 25° 20° 15° 10° 5° 0° 5° 10° 15° 20° 25° 30° 35° 36.7°























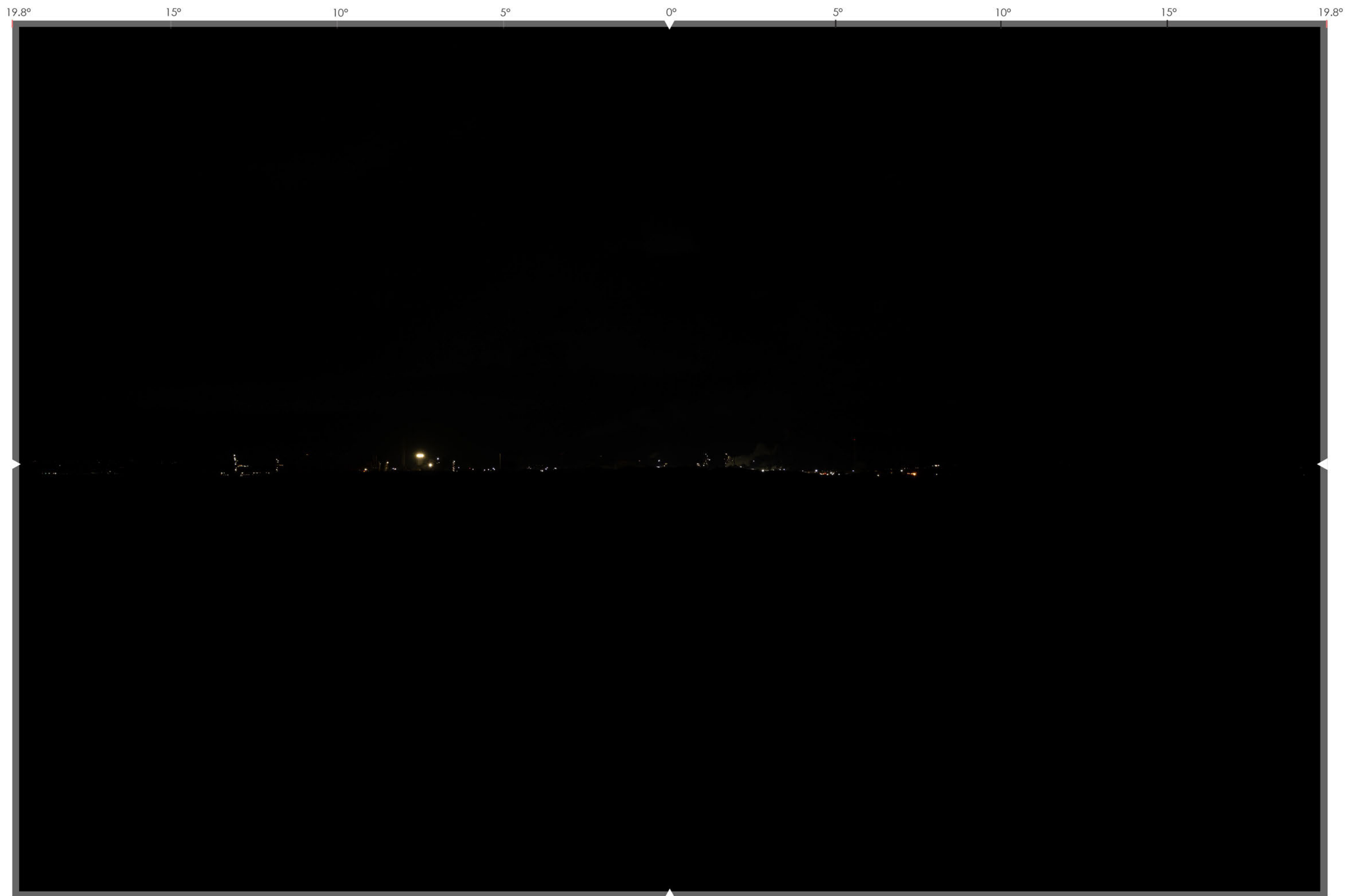


















19.8° 15° 10° 5° 0° 5° 10° 15° 19.8°





19.8° 15° 10° 5° 0° 5° 10° 15° 19.8°



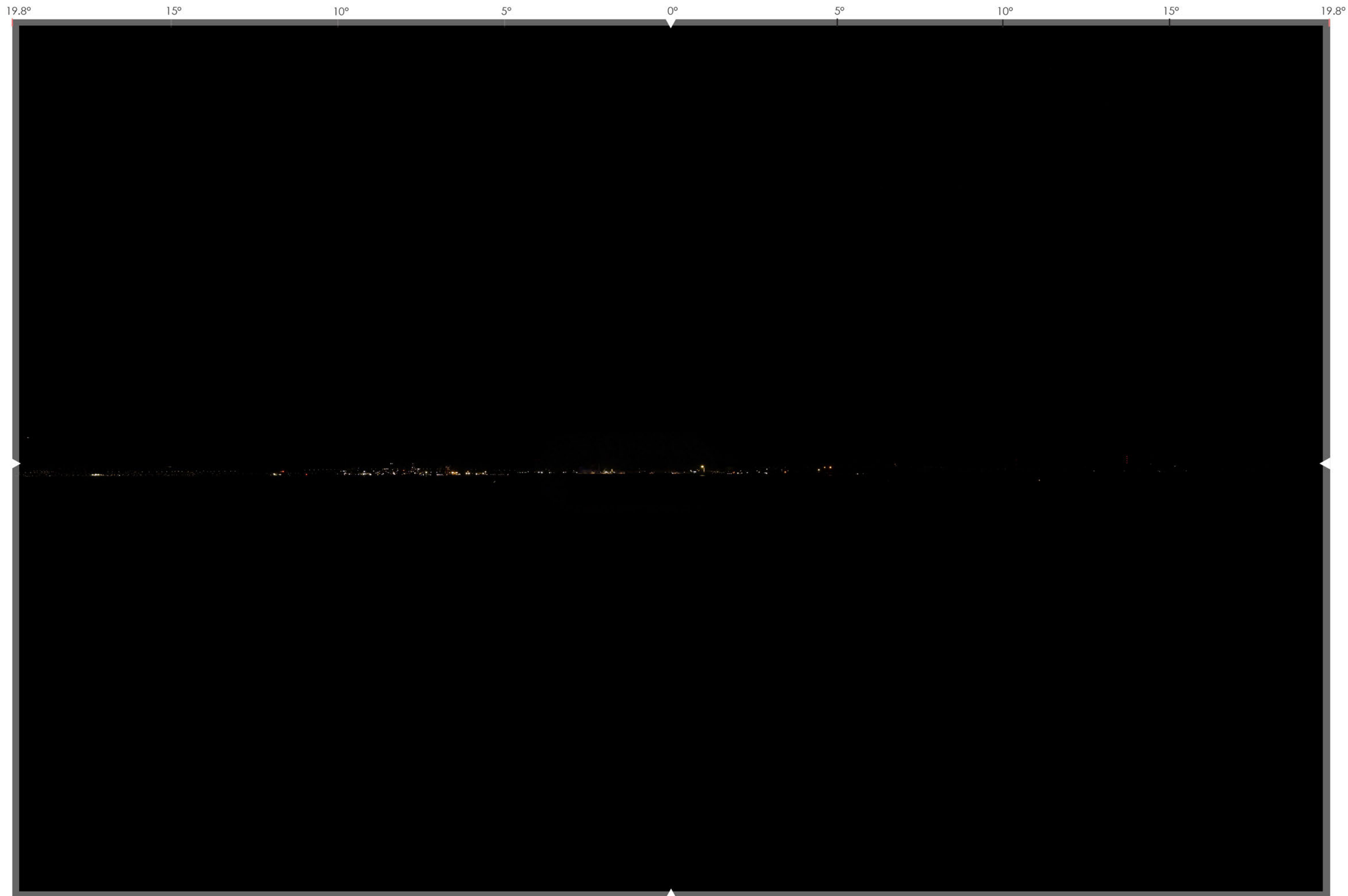












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