BIJLAGEN

VERVOLGSTUDIE
BIJKOMENDE
SCHELDEKRUISING
IN
ANTWERPEN

A1

A/S-TRACE
PLANS AND SECTIONS
ROAD SAFETY AUDIT

AREAS FOR FURTHER DESIGN DEVELOPMENT OF THE 4th ROUTE PROPOSAL

This note summarises possible enhancements or opportunities for improvement of the highway design which can be taken on board by the future design team which will develop further the alignment of the 4th route. These are summarised below into two groups. The first contains notes of the design team on further possible junction enhancements and the seconds contains the findings of the independent design checker and discussion points of the design team.

Junction Enhancement Opportunities

The current layout has been developed to demonstrate a junction layout can be achieved which meets highway criteria. However, junction design should be an iterative process with a number of revisions each building improvements into the previous version. Within the time constraints in which this junction layout has been developed, we have not been able to undertake the iterative improvement process. There are a number of areas where this layout would be improved through further design work these fall into two areas; highway geometry and junction functionality. These areas area described below:

- Junction Footprint – the junction includes some low level roads with associated retaining structures. We have made conservative allowances for the thickness of retaining structures between the various links. In practice and with further development, it would be possible to move most of the links closer together in plan and to reduce the overall footprint of the junction;
- Junction footprint – at this stage we have not tried to stack links above each other, but have shown them separately in plan, again this is a conservative approach and there are some links which could be stacked to reduce the overall footprint.
- Review of the A12 (s/b) and New Crossing (e/b) merge. In order to avoid a short weaving section between the new junction and the existing A12/R1 junction, the diverge on the A12 has been moved north along with moving the New Crossing diverge west, and there is now parallel eastbound carriageways into the A12/R1 junction. This area could be developed further to improve the geometries.
- Review of the junction geometry to aid construction. Whilst an initial review of constructability has been carried out, and is described elsewhere, it is possible that by modifying some of the permanent link geometry the temporary construction phasing stages could be simplified.
- Review of the link provision – links are provided to allow all traffic manoeuvres at the junction. For example connections are provided between the tunnel and the A12 (north). These links replicate moves that are largely available elsewhere (e.g via Liefkenshoek Tunnel). One of the objectives of the scheme is to increase usage these links. It is noted that these links would provide a more direct route from the proposed container facility on the northern edge of the port to the E17. However, incorporating these links requires that an additional level of links are introduced and adversely impacts on the alignment of the link from the port to the New Schelde Crossing, which could run lower and more directly if not required to cross tunnel/A12 (n/b) links.

Road Safety Assessment

A qualified Arup Safety Auditor, independent of the design team, has reviewed the highway design of the new Tunnel and the A12 Ekeren Junction. His comments and discussion with the design team are summarised below. It should be noted that in a short study of this nature not all design issues can be resolved and the designs are indicative.

The Arup/SUM option has an extended bored tunnel beneath the docks, without an Oosterweel junction, and connects to the A12, A1 and R1 to the north of the city. This requires a new junction at low level for the A12 link and to connect to the north side of the Antwerp Docks. Consideration of the alignments for the Arup/SUM to the north of the Schelde option indicates that that the following areas require further study:

Section of Scheme	Safety Issue	Discussion
Northbound exit from the Oosterweel Tunnels	There is an exit slip road which leaves the mainline at the northbound exit portal. This is on the inside of a bend where visibility may be limited and will require drivers to weave across other lanes to reach the exit whilst still in the tunnel. Signing for the exit will need to be provided within the tunnel, It is anticipated that this will require overhead signing of lane designations to operate in a safe manner.	The tunnel will include variable message signing (VMS) over its length for dealing with incidents within the tunnel. At the northern end this VMS could be combined with the directional signage requirement to provide drivers with adequate warning of the exit and provide them time to move to the correct lanes. The tunnel dimensions are adequate to incorporate this signage.
A12 Connection to Port	This contains an exit from lane 2, which is normally considered the 'fast' lane of a one-way, two-lane highway. As this is an access to the docks, a high percentage of heavy goods vehicles could weave across the path of faster moving vehicles, leading to a potential for side-to-side collisions, sudden braking and rear-end shunt accidents.	This is a split in the exit link allowing traffic to continue west and north on the Noordelaan or to turn south (onto Oosterveelsteenweg) or east. The link will be low speed by this point with a maximum limit of 60kph, with the lanes signed for the directions. There is an adequate distance between the merge with the link from A12 southbound and the junction to allow weaving to take place
A12 North to Port	This passes through a tightening alignment This link reduces from 500m to 250m radius. Depending on traffic conditions, this could lead to sudden corrections by drivers causing loss of control, side-to-side collisions, sudden braking and shunts. The tightening of the curvature occurs on the immediate approach to a merge, and there could be a problem with loss of forward visibility.	The link is an off link from the motorway and speed restrictions can be applied to this link. The merge is with the link from the A12 south to the docks, the merge can be extended to increase forward visibility opportunities subject to detail design.
Noorderlaan East to Oosterweel Tunnel	This has an 898m radius right-hand bend running into a merge to a 150m radius left-hand bend, with no transitions. This is a sudden drop in standard which could have high-speed traffic trying to merge into a low-speed traffic lane. There could be significant speed differentials resulting in side-to-side collisions, sudden braking, shunts and loss of control	The Noorderlaan is not a high speed road, the 898m radius road is on incline. It is not anticipated that vehicles will be travelling at high speeds over this section and a speed restriction could be applied. Once around the 150m radius bend, vehicles have an adequate distance to achieve suitable speed to merge with the motorway traffic.

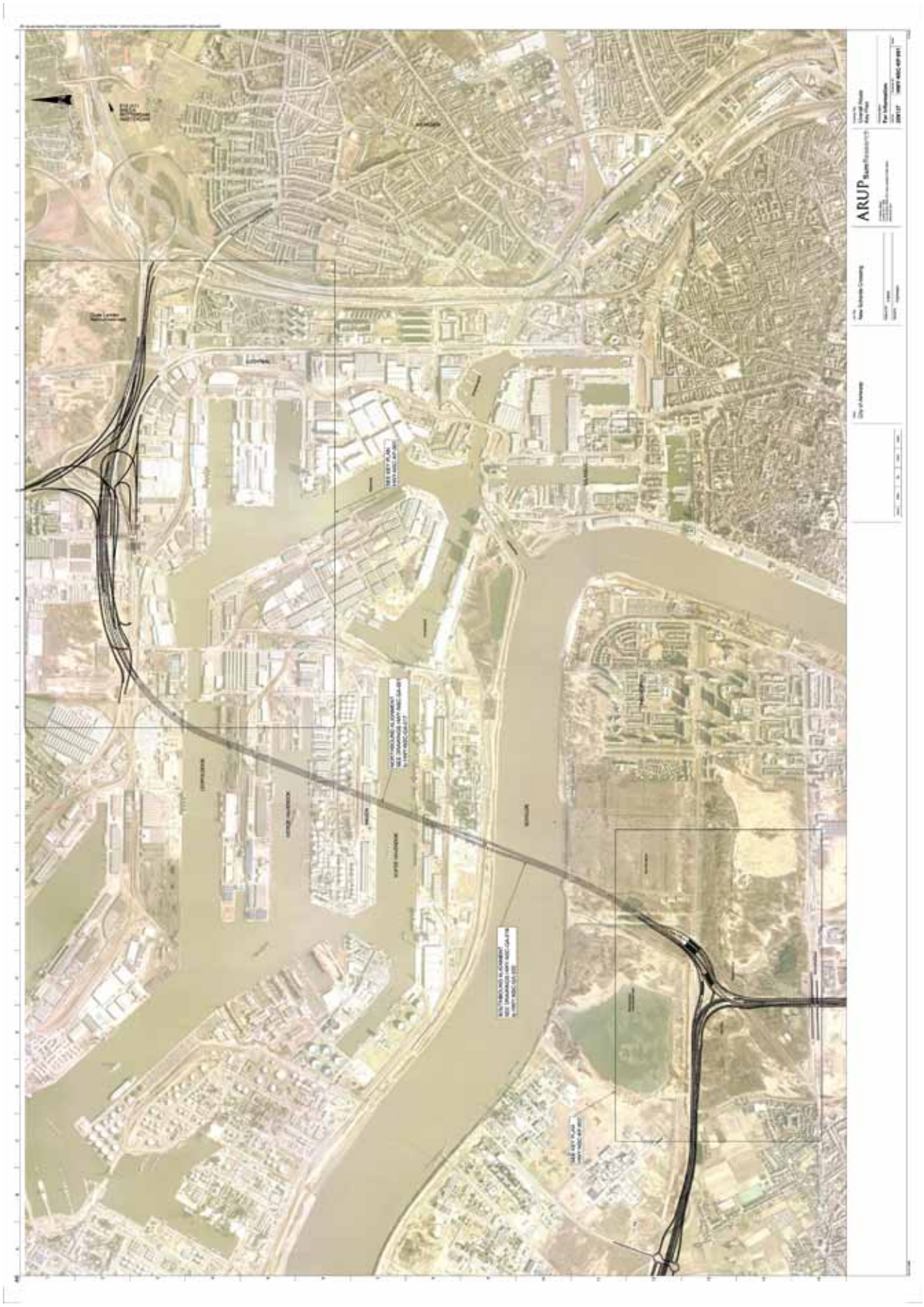
Oosterweel Tunnel to Noorderlaan	This has a straight alignment running into a 70m radius 180 degree bend. There is a risk that high-speed traffic leaving the tunnel will carry on at high speed up the 3% gradient and suddenly be confronted with a sharp right-hand bend, with the added complication of an exit off to the left where the road splits to Noorderlaan east and west. This could lead to loss of control, sudden and late lane changing within the start of the bend, sudden braking, side-to side and rear-end shunt collisions.	This link is currently a 70m radius bend reached at the end of a length of 3% grade road. It is anticipated that this will be a low speed corner, to minimise accident risks. During design development it is anticipated that this radius could be increased further to something in the order of 80m radius. The merge with the Noorderlaan westbound occurs on a local road with lower speeds and could incorporate a lane gain from the new link.
Eastbound Main-line	On leaving the tunnel, there is a succession of exit, entry and exit manoeuvres over a relatively short distance, and all in a right-hand curve. There can be expected to be considerable amounts of weaving and the lengths between the junctions need to be maximised.	The distance between the entry merge for traffic joining from the docks and the diverge for the split between R1 southbound and E19 northbound is approximately 1100m. We believe that this is an acceptable weave length and there may be scope to increase it further during detail design.

The conclusion of the Safety Auditor's analysis was that these specific areas all appear to be soluble during design progression, and with the application of appropriate levels of speed control and direction signing.

New Schelde Crossing Alignment – Drawing List

	Drawing Number	Description	
01_Key Plans			
1	HWY-NSC-KP-001	New Schelde Crossing – Key Plan	
2	HWY-NSC-KP-002	Linkeroever Interchange – Key Plan	
3	HWY-NSC-KP-003	A12 Interchange – Key Plan	
02A_Northbound Main Alignment			
4	HWY-NSC-GA-001	General Arrangement and Long Section	Sheet 1 of 17
5	HWY-NSC-GA-002	General Arrangement and Long Section	Sheet 2 of 17
6	HWY-NSC-GA-003	General Arrangement and Long Section	Sheet 3 of 17
7	HWY-NSC-GA-004	General Arrangement and Long Section	Sheet 4 of 17
8	HWY-NSC-GA-005	General Arrangement and Long Section	Sheet 5 of 17
9	HWY-NSC-GA-006	General Arrangement and Long Section	Sheet 6 of 17
10	HWY-NSC-GA-007	General Arrangement and Long Section	Sheet 7 of 17
11	HWY-NSC-GA-008	General Arrangement and Long Section	Sheet 8 of 17
12	HWY-NSC-GA-009	General Arrangement and Long Section	Sheet 9 of 17
13	HWY-NSC-GA-010	General Arrangement and Long Section	Sheet 10 of 17
14	HWY-NSC-GA-011	General Arrangement and Long Section	Sheet 11 of 17
15	HWY-NSC-GA-012	General Arrangement and Long Section	Sheet 12 of 17
16	HWY-NSC-GA-013	General Arrangement and Long Section	Sheet 13 of 17
17	HWY-NSC-GA-014	General Arrangement and Long Section	Sheet 14 of 17
18	HWY-NSC-GA-015	General Arrangement and Long Section	Sheet 15 of 17
19	HWY-NSC-GA-016	General Arrangement and Long Section	Sheet 16 of 17
20	HWY-NSC-GA-017	General Arrangement and Long Section	Sheet 17 of 17
02B_Southbound Main Alignment			
21	HWY-NSC-GA-018	General Arrangement and Long Section	Sheet 1 of 18
22	HWY-NSC-GA-019	General Arrangement and Long Section	Sheet 2 of 18
23	HWY-NSC-GA-020	General Arrangement and Long Section	Sheet 3 of 18
24	HWY-NSC-GA-021	General Arrangement and Long Section	Sheet 4 of 18
25	HWY-NSC-GA-022	General Arrangement and Long Section	Sheet 5 of 18
26	HWY-NSC-GA-023	General Arrangement and Long Section	Sheet 6 of 18
27	HWY-NSC-GA-024	General Arrangement and Long Section	Sheet 7 of 18
28	HWY-NSC-GA-025	General Arrangement and Long Section	Sheet 8 of 18
29	HWY-NSC-GA-026	General Arrangement and Long Section	Sheet 9 of 18
30	HWY-NSC-GA-027	General Arrangement and Long Section	Sheet 10 of 18
31	HWY-NSC-GA-028	General Arrangement and Long Section	Sheet 11 of 18
32	HWY-NSC-GA-029	General Arrangement and Long Section	Sheet 12 of 18
33	HWY-NSC-GA-030	General Arrangement and Long Section	Sheet 13 of 18
34	HWY-NSC-GA-031	General Arrangement and Long Section	Sheet 14 of 18
35	HWY-NSC-GA-032	General Arrangement and Long Section	Sheet 15 of 18
36	HWY-NSC-GA-033	General Arrangement and Long Section	Sheet 16 of 18
37	HWY-NSC-GA-034	General Arrangement and Long Section	Sheet 17 of 18
38	HWY-NSC-GA-035	General Arrangement and Long Section	Sheet 18 of 18

03_A12 Interchange			
39	HWY-NSC-J-101-1	A12 (N/B) to Port	Sheet 1 of 4
40	HWY-NSC-J-101-2	A12 (N/B) to Port	Sheet 2 of 4
41	HWY-NSC-J-101-3	A12 (N/B) to Port	Sheet 3 of 4
42	HWY-NSC-J-101-4	A12 (N/B) to Port	Sheet 4 of 4
43	HWY-NSC-J-102-1	A12 (S/B) to E19	Sheet 1 of 3
44	HWY-NSC-J-102-2	A12 (S/B) to E19	Sheet 2 of 3
45	HWY-NSC-J-102-3	A12 (S/B) to E19	Sheet 3 of 3
46	HWY-NSC-J-103-1	A12 (S/B) to Port	Sheet 1 of 2
47	HWY-NSC-J-103-2	A12 (S/B) to Port	Sheet 2 of 2
48	HWY-NSC-J-104-1	Oosterveel to E19/R1	Sheet 1 of 1
49	HWY-NSC-J-105-1	A12 Northbound	Sheet 1 of 2
50	HWY-NSC-J-105-2	A12 Northbound	Sheet 2 of 2
51	HWY-NSC-J-106-1	A12 (S/B) to Schelde Crossing	Sheet 1 of 1
52	HWY-NSC-J-107-1	A12 (S/B) to R1 Link	Sheet 1 of 3
53	HWY-NSC-J-107-2	A12 (S/B) to R1 Link	Sheet 2 of 3
54	HWY-NSC-J-107-3	A12 (S/B) to R1 Link	Sheet 3 of 3
55	HWY-NSC-J-108-1	Noordelaan (E/B) to E19/R1 (S/B)	Sheet 1 of 2
56	HWY-NSC-J-108-2	Noordelaan (E/B) to E19/R1 (S/B)	Sheet 2 of 2
57	HWY-NSC-J-109-1	Noordelaan (W/B) to Tunnel	Sheet 1 of 2
58	HWY-NSC-J-109-2	Noordelaan (W/B) to Tunnel	Sheet 2 of 2
59	HWY-NSC-J-110-1	Noordelaan to E19/R1 (S/B)	Sheet 1 of 2
60	HWY-NSC-J-110-2	Noordelaan to E19/R1 (S/B)	Sheet 2 of 2
61	HWY-NSC-J-111-1	Noordelaan to A12 (N/B)	Sheet 1 of 3
62	HWY-NSC-J-111-2	Noordelaan to A12 (N/B)	Sheet 2 of 3
63	HWY-NSC-J-111-3	Noordelaan to A12 (N/B)	Sheet 3 of 3
64	HWY-NSC-J-112-1	Noordelaan (E/B) to Tunnel	Sheet 1 of 4
65	HWY-NSC-J-112-2	Noordelaan (E/B) to Tunnel	Sheet 2 of 4
66	HWY-NSC-J-112-3	Noordelaan (E/B) to Tunnel	Sheet 3 of 4
67	HWY-NSC-J-112-4	Noordelaan (E/B) to Tunnel	Sheet 4 of 4
68	HWY-NSC-J-113-1	Oosterveel Link	Sheet 1 of 1
69	HWY-NSC-J-114-1	Schelde Crossing to A12 (N/B)	Sheet 1 of 2
70	HWY-NSC-J-114-2	Schelde Crossing to A12 (N/B)	Sheet 2 of 2
71	HWY-NSC-J-115-1	Schelde Crossing to Noordelaan	Sheet 1 of 3
72	HWY-NSC-J-115-2	Schelde Crossing to Noordelaan	Sheet 2 of 3
73	HWY-NSC-J-115-3	Schelde Crossing to Noordelaan	Sheet 3 of 3
74	HWY-NSC-J-116-1	Schelde Crossing to Noordelaan (E/B)	Sheet 1 of 1
75	HWY-NSC-J-117-1	Schelde Crossing to R1	Sheet 1 of 3
76	HWY-NSC-J-117-2	Schelde Crossing to R1	Sheet 2 of 3
77	HWY-NSC-J-117-3	Schelde Crossing to R1	Sheet 3 of 3
04_Linkeroever Interchange			
78	HWY-NSC-J-001-1	E34 to Schelde Crossing (N/B)	Sheet 1 of 3
79	HWY-NSC-J-001-2	E34 to Schelde Crossing (N/B)	Sheet 2 of 3
80	HWY-NSC-J-001-3	E34 to Schelde Crossing (N/B)	Sheet 3 of 3
81	HWY-NSC-J-002-1	Schelde Crossing (S/B) to E34	Sheet 1 of 2
82	HWY-NSC-J-002-1	Schelde Crossing (S/B) to E34	Sheet 2 of 2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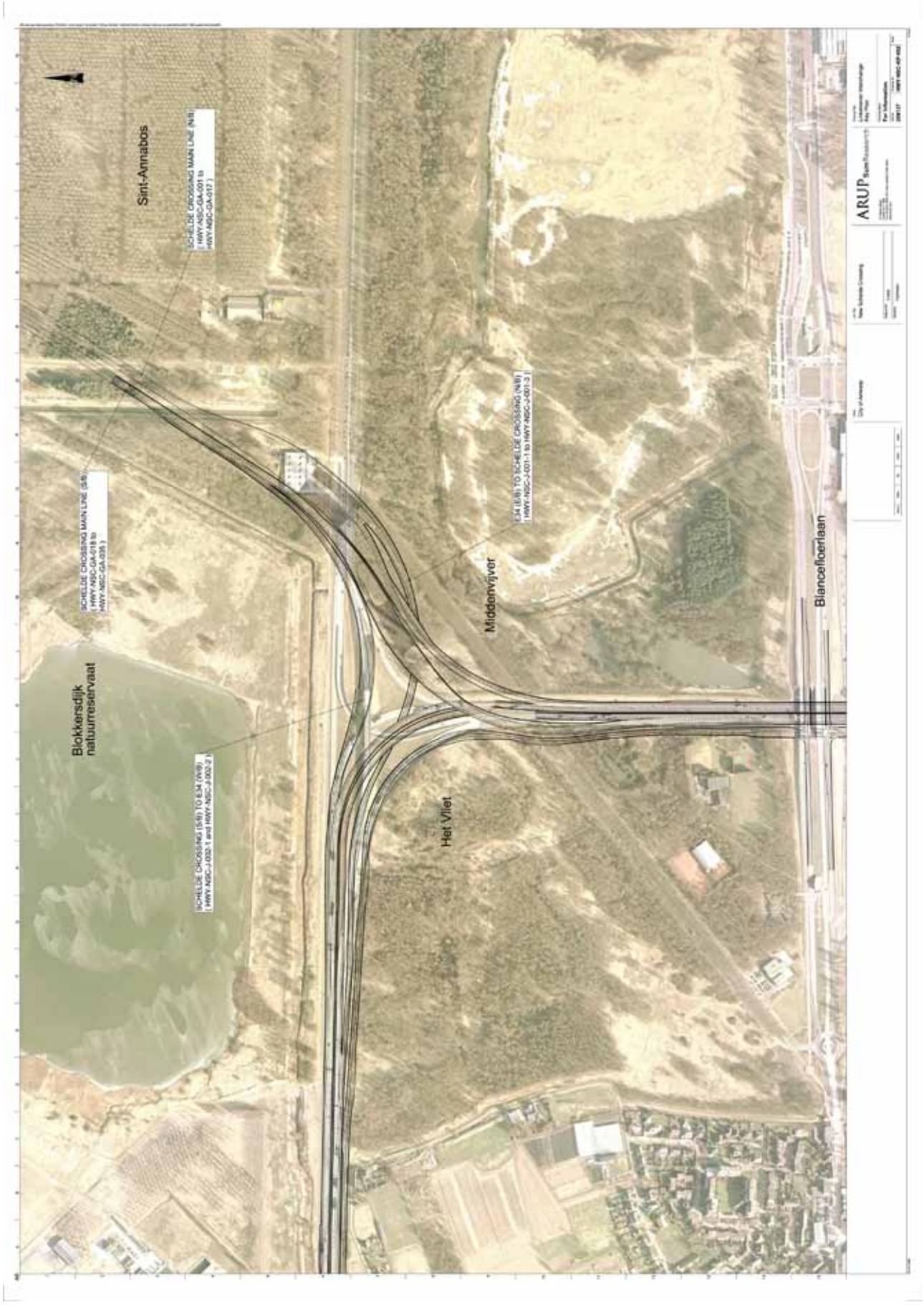
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HWY-NSC-GA-017)
SCHELDE CROSSING MAIN LINE (S/B)
(HWY-NSC-GA-018 to
HWY-NSC-GA-035)
E34 (E/B) TO SCHELDE CROSSING (N/B)
(HWY-NSC-J-001-1 to HWY-NSC-J-001-3)
Middenvijver
Blancefloerlaan
Blokkersdijk
natuurreservaat
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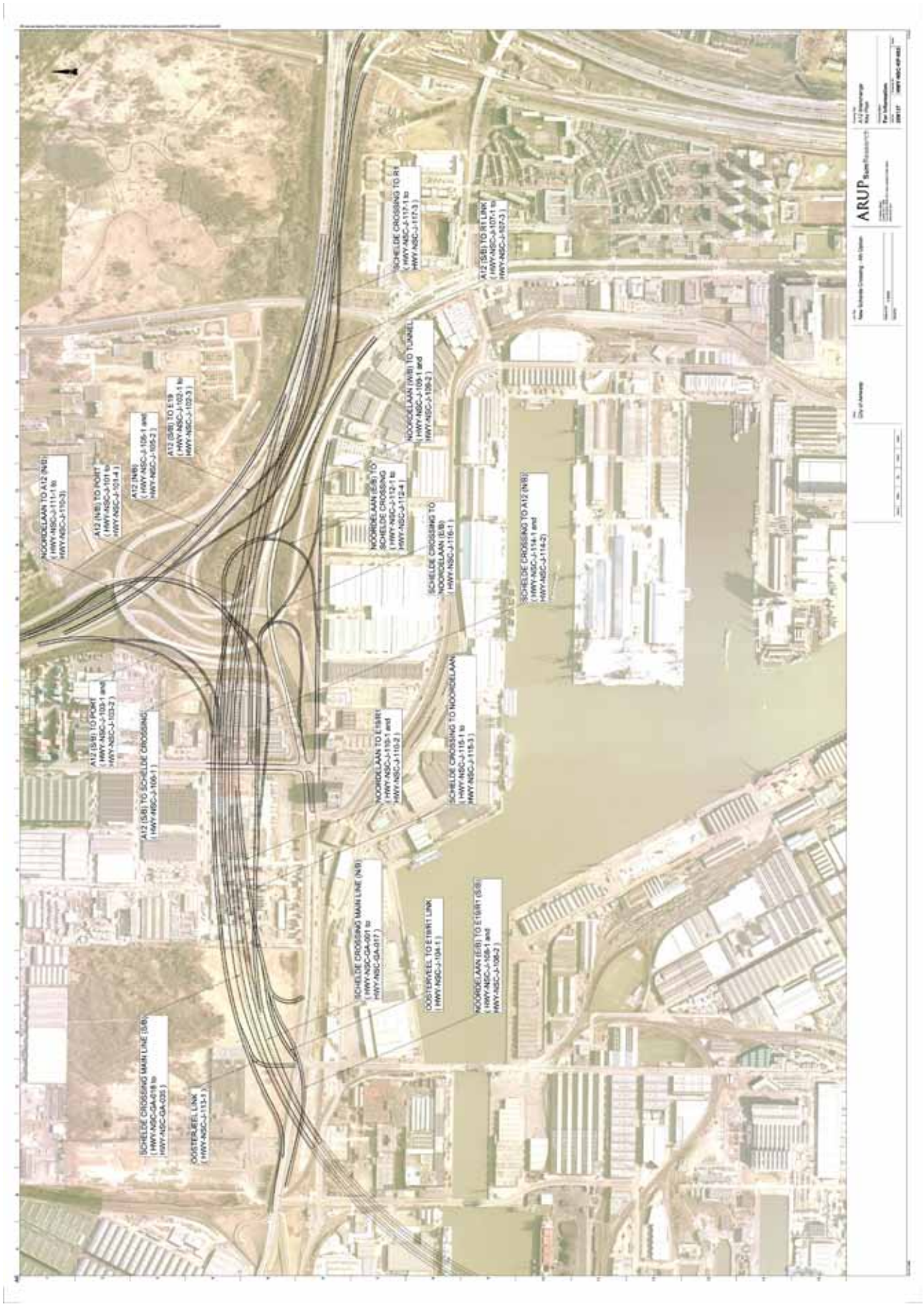
(HWY-NSC-J-002-1 and HWY-NSC-J-002-2)
Het Vliet
ARUP


NOORDELAAN TO A12 (NB)
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HWY-NSC-J-110-3)
A12 (NB) TO PORT
(HWY-NSC-J-101 to
HWY-NSC-J-101-4)
A12 (NB)
(HWY-NSC-J-105-1 and
HWY-NSC-J-105-2)
A12 (SB) TO E19
(HWY-NSC-J-102-1 to
HWY-NSC-J-102-3)
SCHELDE CROSSING TO R1
(HWY-NSC-J-117-1 to
HWY-NSC-J-117-3)
A12 (SB) TO R1 LINK
(HWY-NSC-J-107-1 to
HWY-NSC-J-107-3)
NOORDELAAN (WB) TO T-TUNNEL
(HWY-NSC-J-109-1 and
HWY-NSC-J-109-2)
NOORDELAAN (EB) TO
SCHELDE CROSSING
(HWY-NSC-J-112-1 to
HWY-NSC-J-112-4)
SCHELDE CROSSING TO
NOORDELAAN (EB)
(HWY-NSC-J-116-1)
SCHELDE CROSSING TO A12 (NB)
(HWY-NSC-J-114-1 and
HWY-NSC-J-114-2)
A12 (SB) TO PORT
(HWY-NSC-J-103-1 and
HWY-NSC-J-103-2)
A12 (SB) TO SCHELDE CROSSING
(HWY-NSC-J-106-1)
NOORDELAAN TO E19/R1
(HWY-NSC-J-119-1 and
HWY-NSC-J-119-2)
SCHELDE CROSSING TO NOORDELAAN
(HWY-NSC-J-115-1 to
HWY-NSC-J-115-3)
SCHELDE CROSSING MAIN LINE (SB)
(HWY-NSC-GA-018 to
HWY-NSC-GA-035)
OOSTERWEEL LINK
(HWY-NSC-J-113-1)
SCHELDE CROSSING MAIN LINE (NB)
(HWY-NSC-GA-001 to
HWY-NSC-GA-017)
OOSTERWEEL TO E19/R1 LINK
(HWY-NSC-J-104-1)
NOORDELAAN (EB) TO E19/R1 (SB)
(HWY-NSC-J-108-1 and
HWY-NSC-J-108-2)
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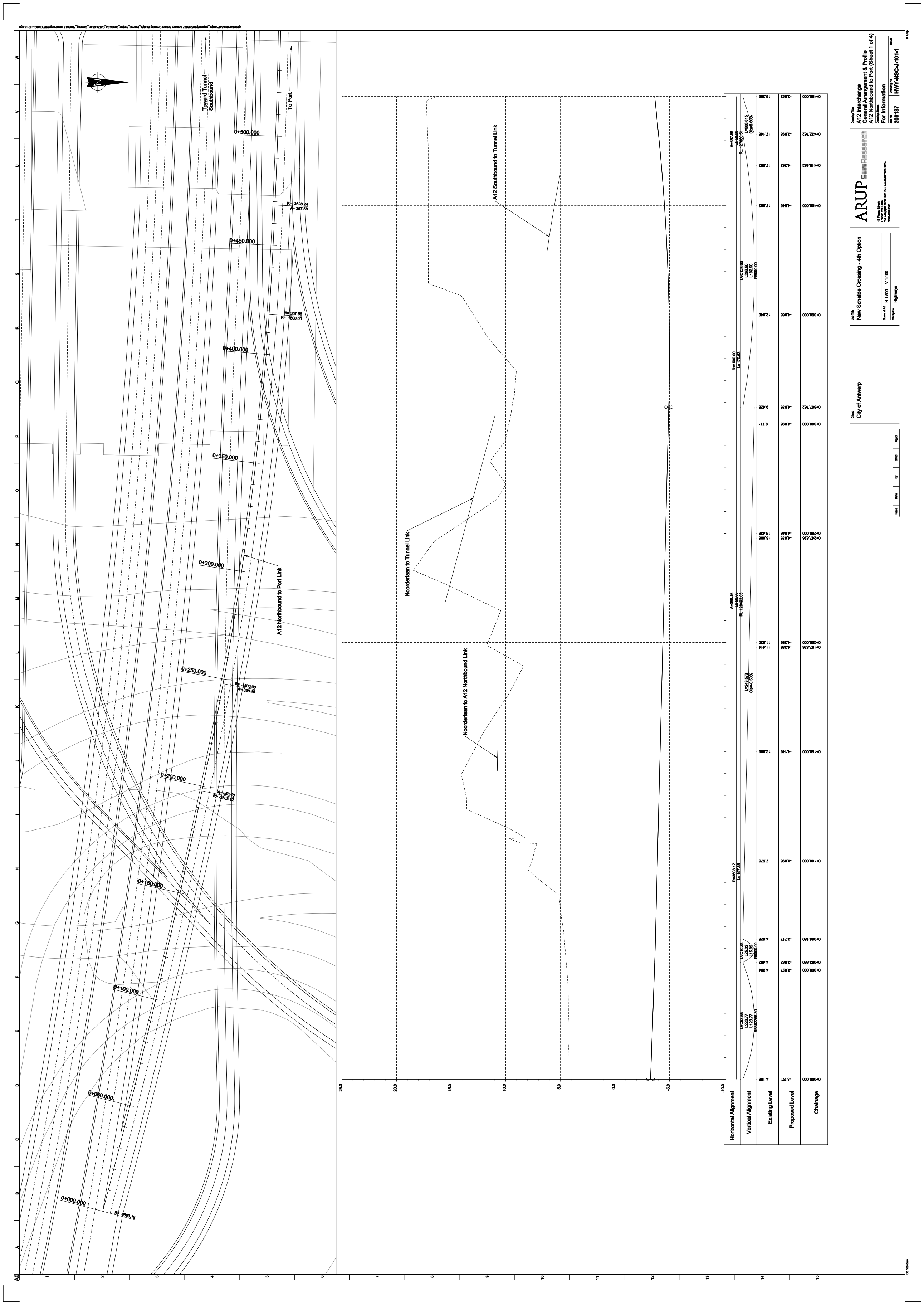
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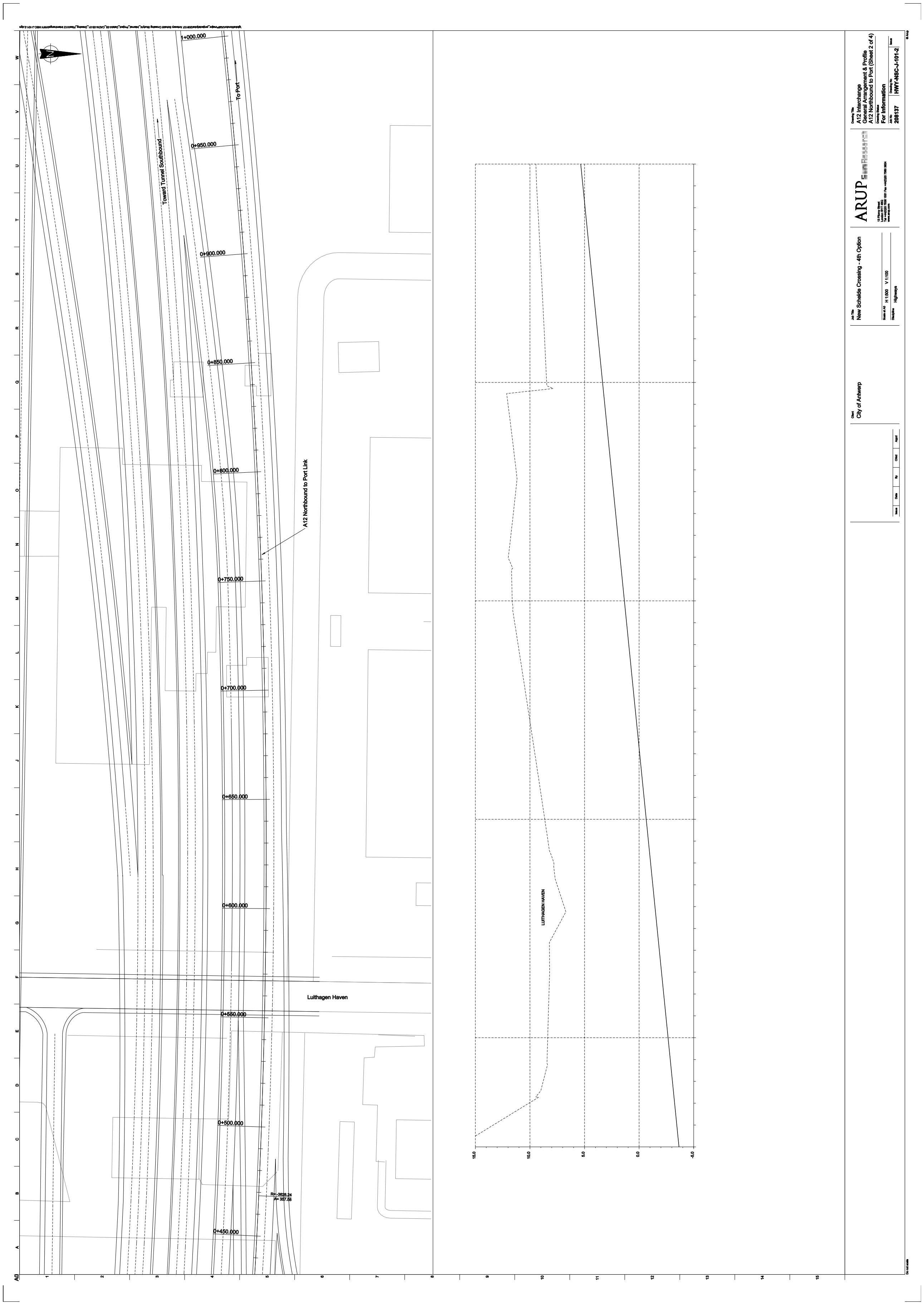
A12 Northbound to Port Link
A12 Southbound to Tunnel Link
Noorderlaan to Tunnel Link
Noorderlaan to A12 Northbound Link
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
New Schelde Crossing - 4th Option
ARUP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0+550.000
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To Port
Toward Tunnel Southbound
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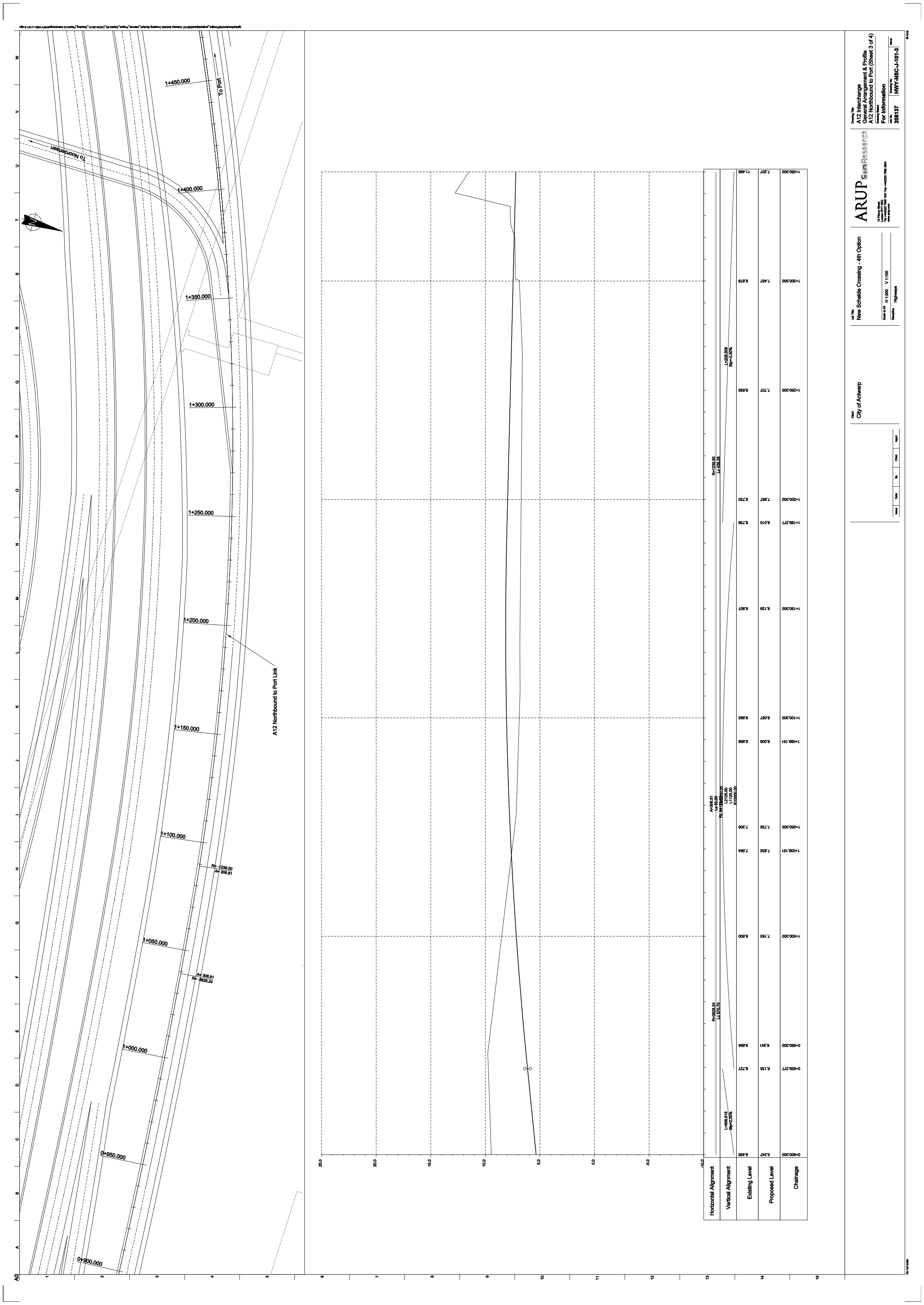
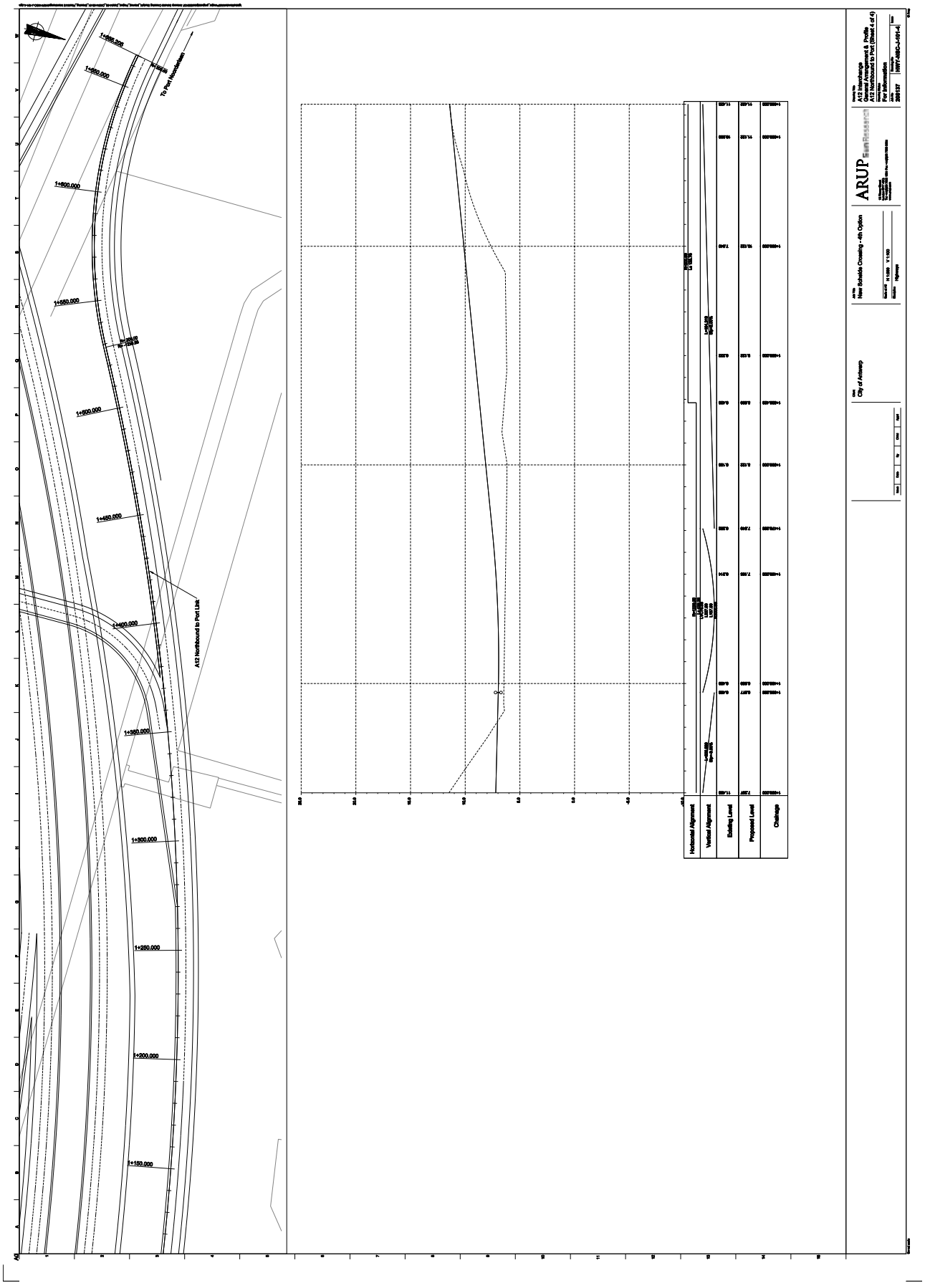
Luithagen Haven
LUITHAGEN HAVEN
City of Antwerp
ARUP


A12 Northbound to Port Link
To Port
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
New Schelde Crossing - 4th Option
A12 Interchange
General Arrangement & Profile
A12 Northbound to Port (Sheet 3 of 4)
For Information
ARUP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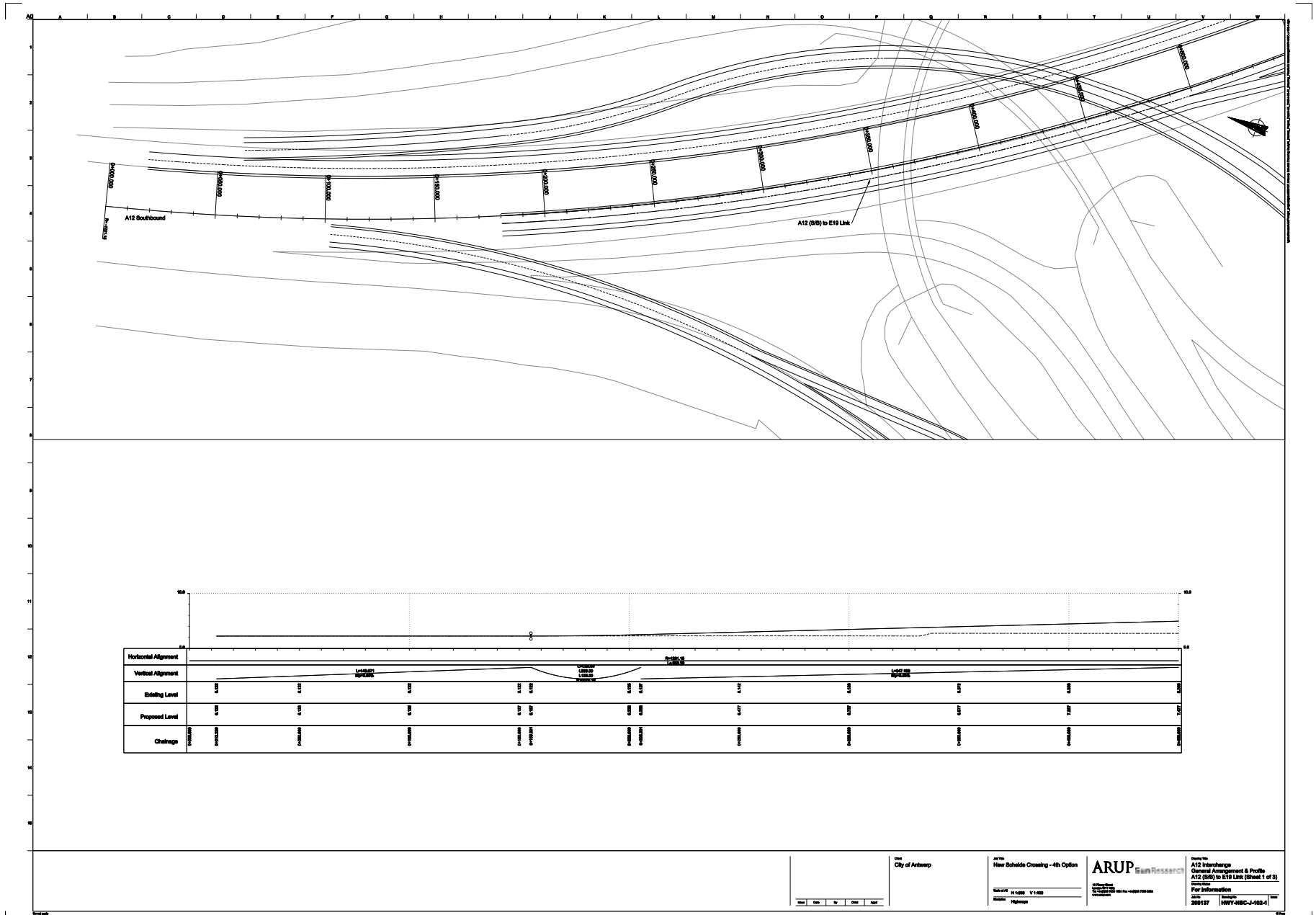
1+400.000
1+350.000
1+300.000
1+250.000
1+200.000
1+150.000
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
A12 Interchange
Detail Arrangement & Profile
A12 Northbound to Port Link (Sheet 4 of 6)
For Information
Near Schelde Crossing - 4th Option
City of Antwerp
ARUP



Issue	Date	By	Chkd	Appd

Client
City of Antwerp

Job Title
New Scheldt Crossing - 4th Option

Scale @ A0 H 1:500 V 1:100

Discipline Highways

ARUP SamResearch

Drawing Title
A12 Interchange
General Arrangement & Profile
A12 (S/B) to E19 Link (Sheet 1 of 3)

Drawing Status
For Information

Job No. 269137

Drawing No. HWY-NSC-J-102-4

Issue

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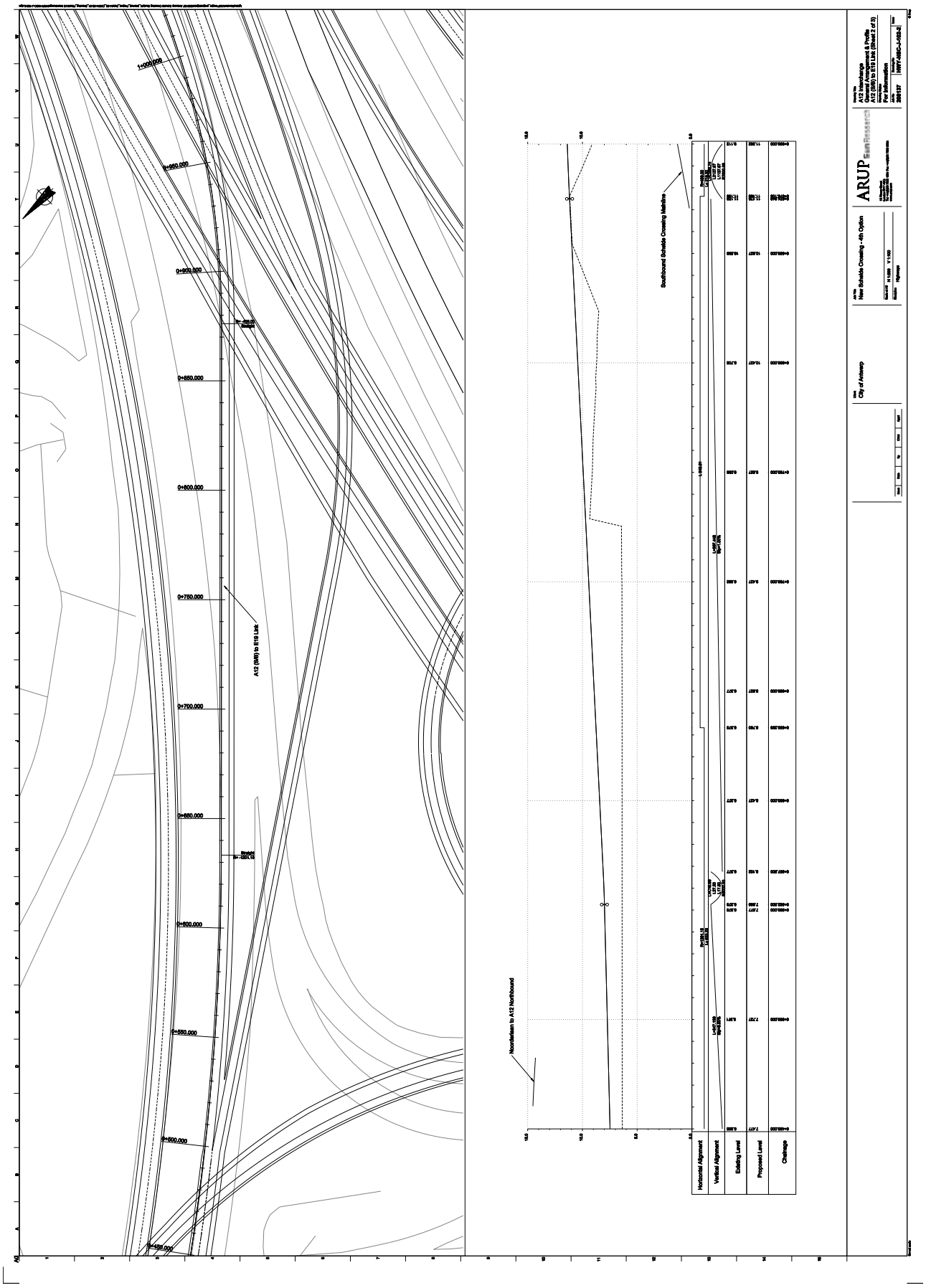
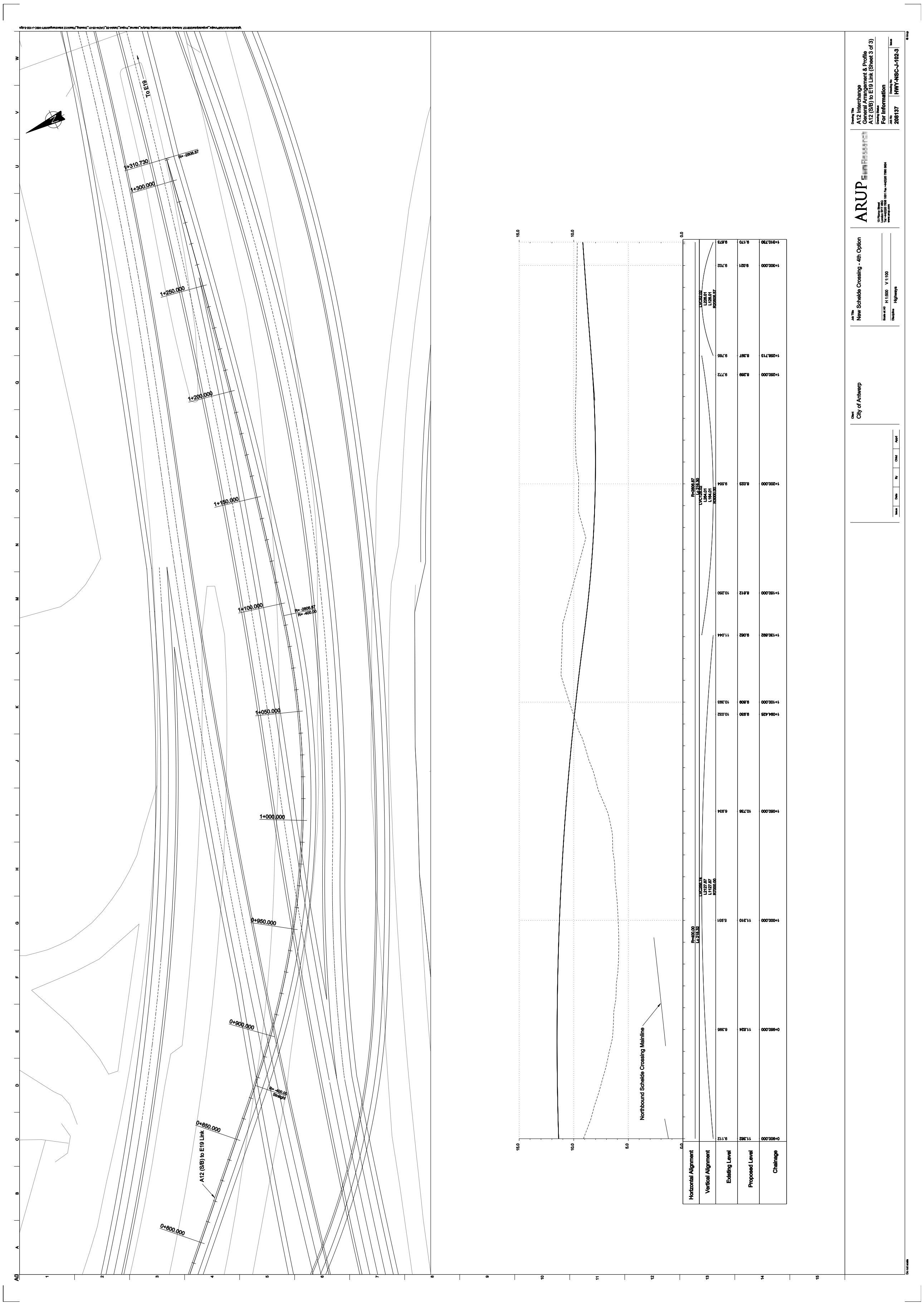
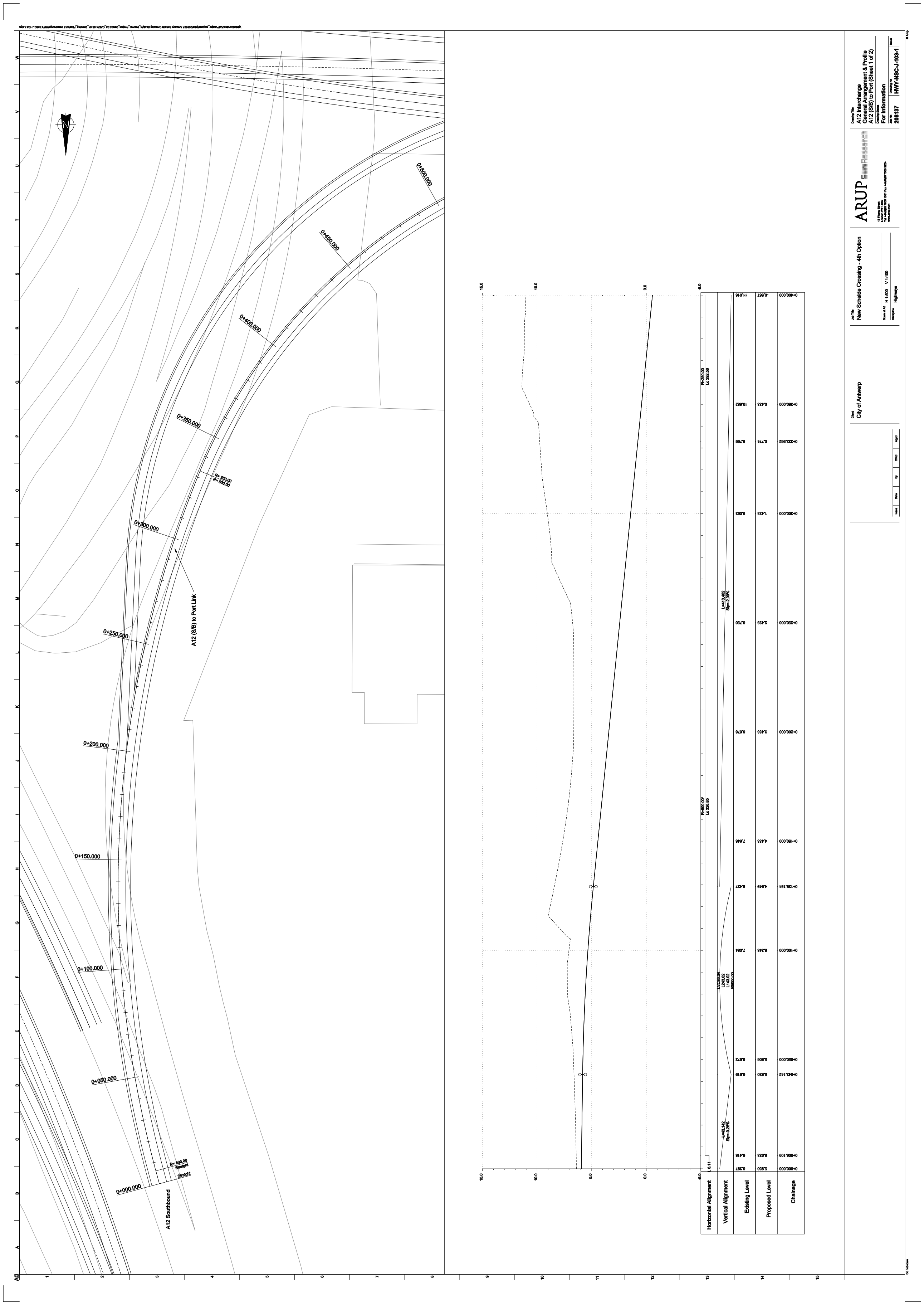
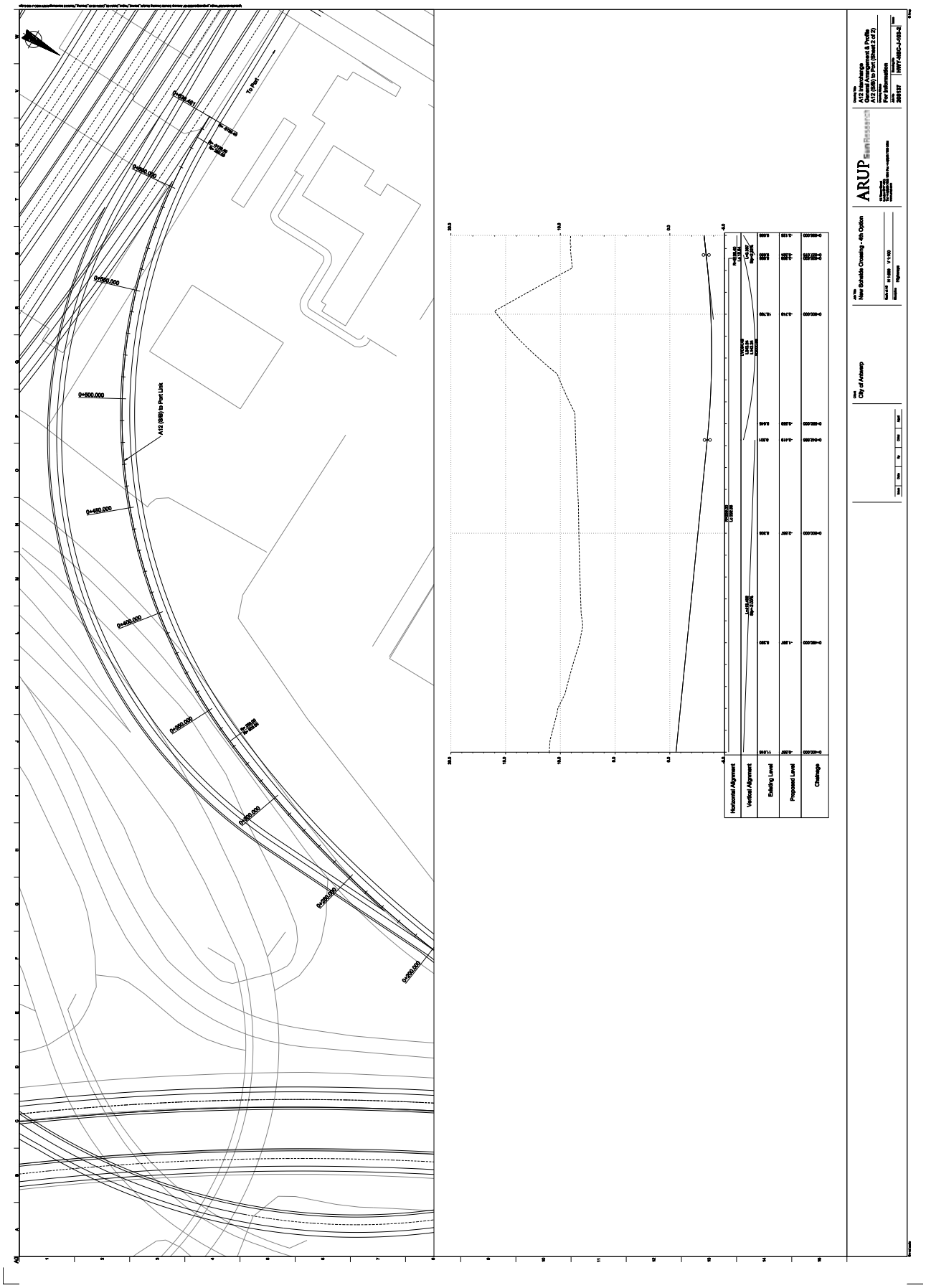

A12 (SMB) to E19 Link
Southbound Schelde Crossing Mainline
Noordelijn to A12 Northbound
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
Near Schelde Crossing - 4th Option
ARUP
A12 Interchange
A12 (SMB) to E19 Link
Scale 1:1000 V 1:100
Highways


To E19
A12 (S/B) to E19 Link
Northbound Schelde Crossing Mainline
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
New Schelde Crossing - 4th Option
A12 Interchange
General Arrangement & Profile
A12 (S/B) to E19 Link (Sheet 3 of 3)
For Information
ARUP


A12 Southbound
A12 (S/B) to Port Link
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
ARUP


A12 (SB) to Port Link
To Port
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0+250.000
0+200.000
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
Near Schelde Crossing - 4th Option
ARUP
A12 Interchange
Detailed Design Contract 4 Profile
A12 (SB) to Port Link (Sheet 2 of 2)
For Information
206127
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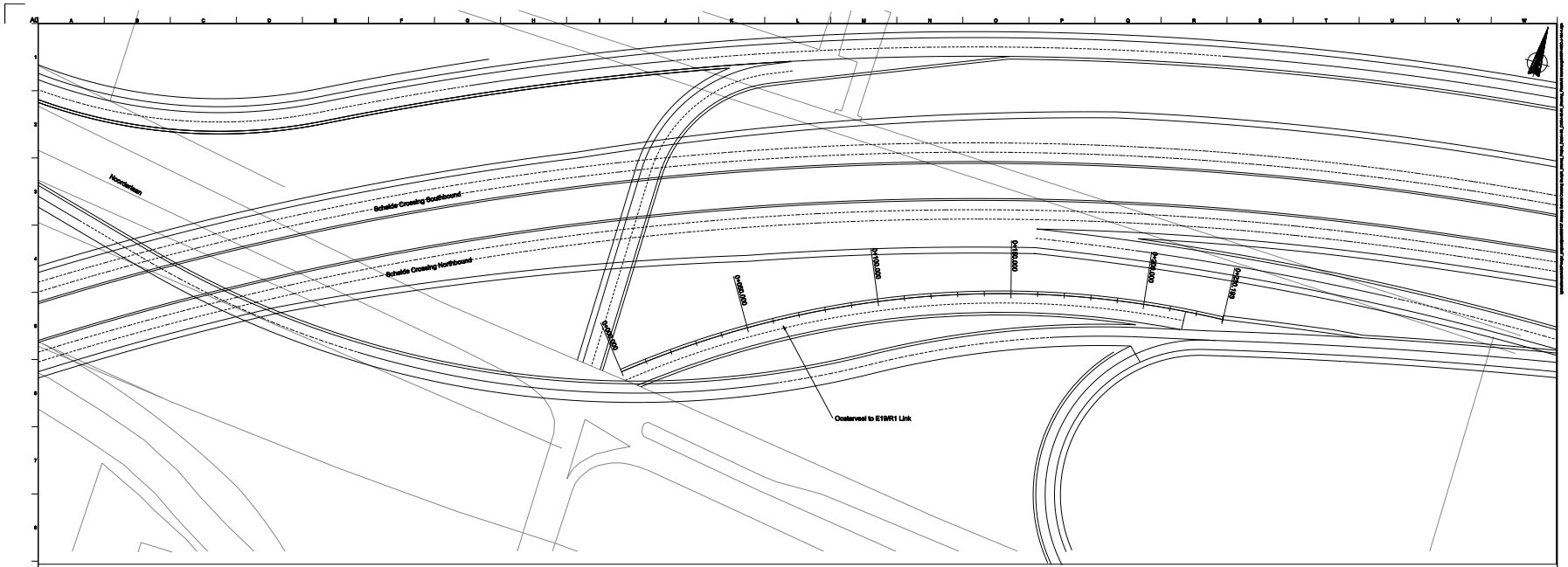
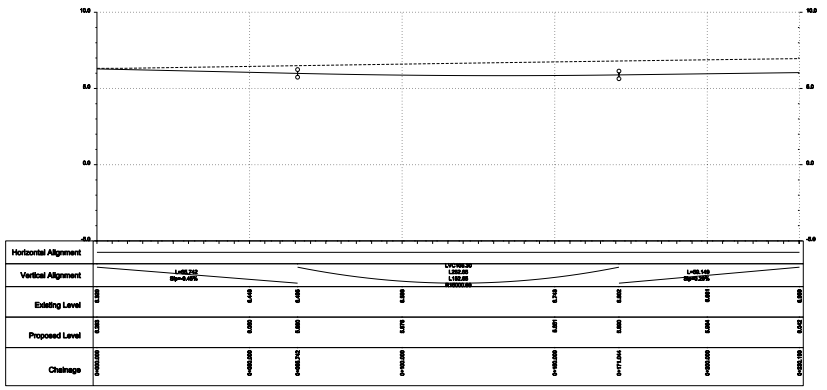




Issue	Date	By	Chkd	Appd

Client: City of Antwerp

Job Title: New Schelde Crossing - 4th Option

Scale (A3): H 1:500 V 1:100

Discipline: Highways

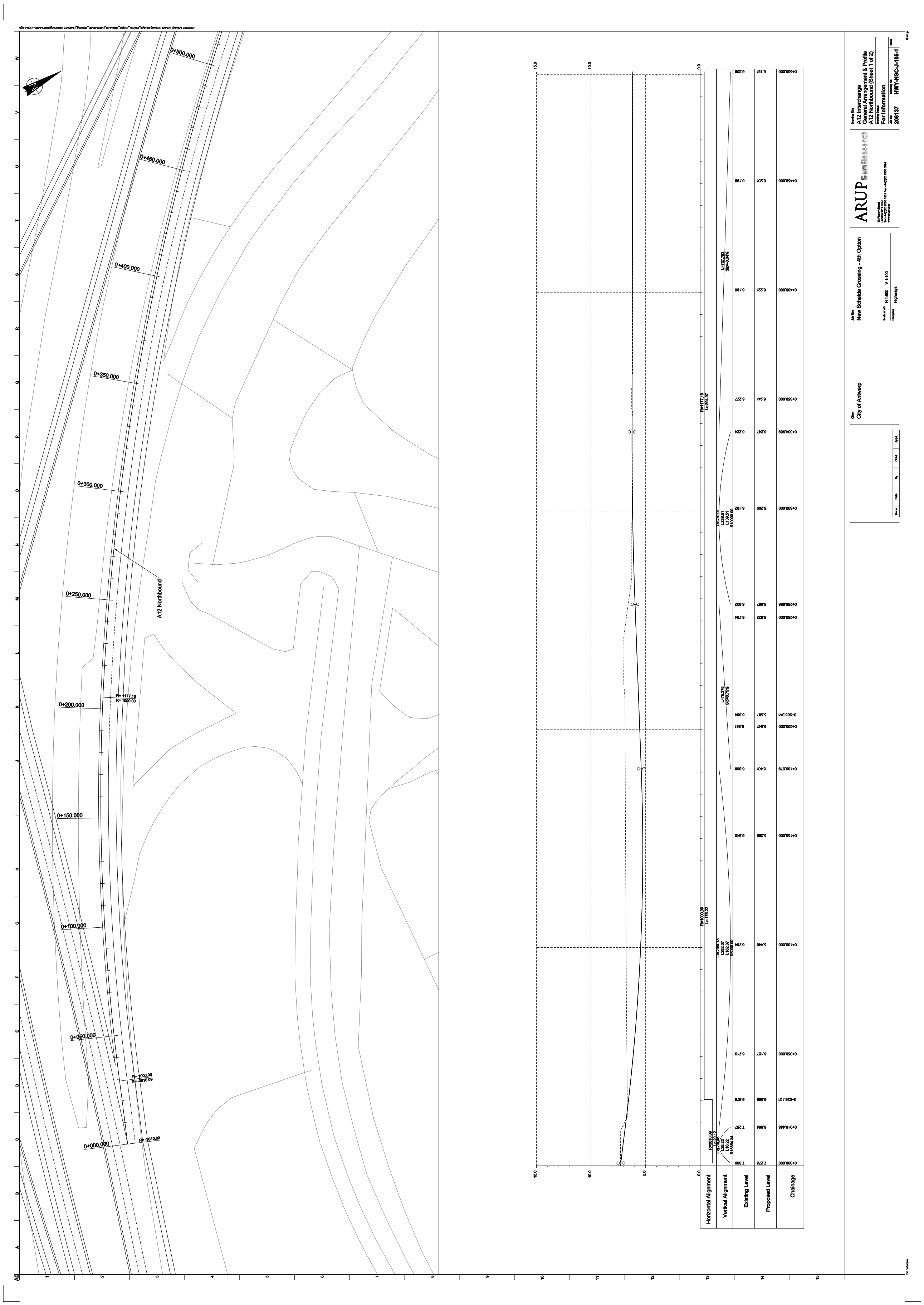
ARUP SamResearch

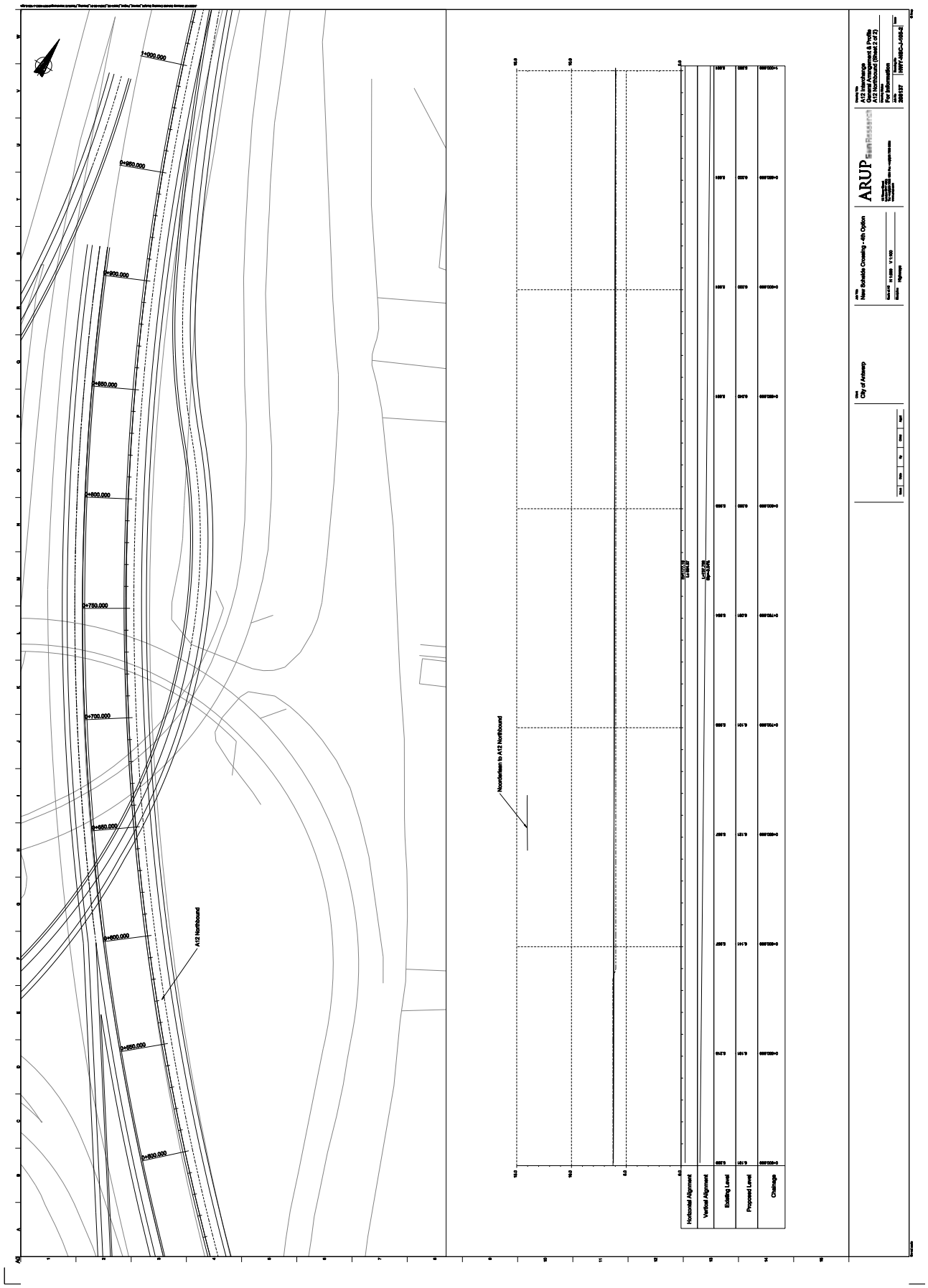
Drawing Title: A12 Interchange
General Arrangement & Profile
Oosterweel to E19/R1 Link

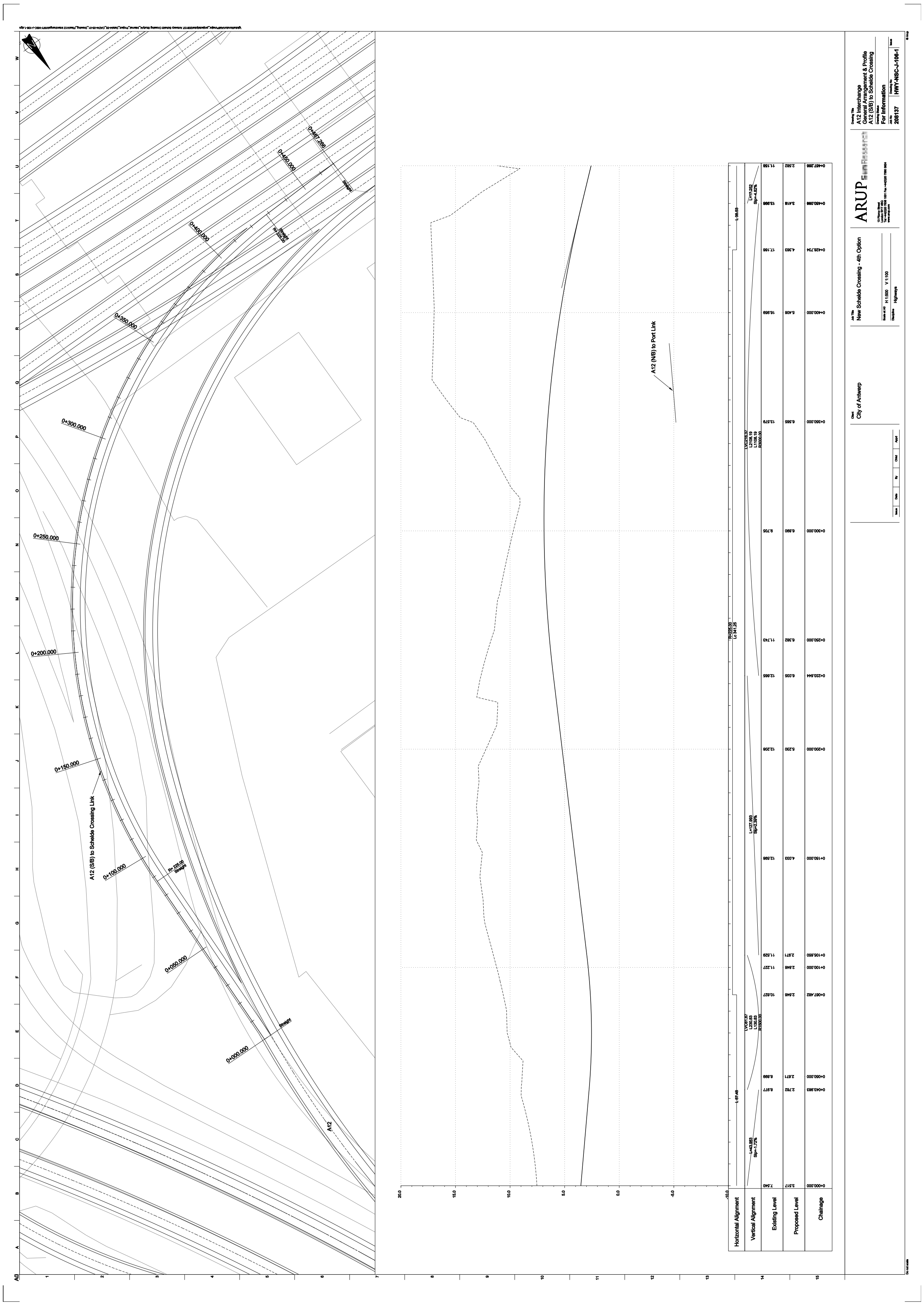
Drawing Status: For Information

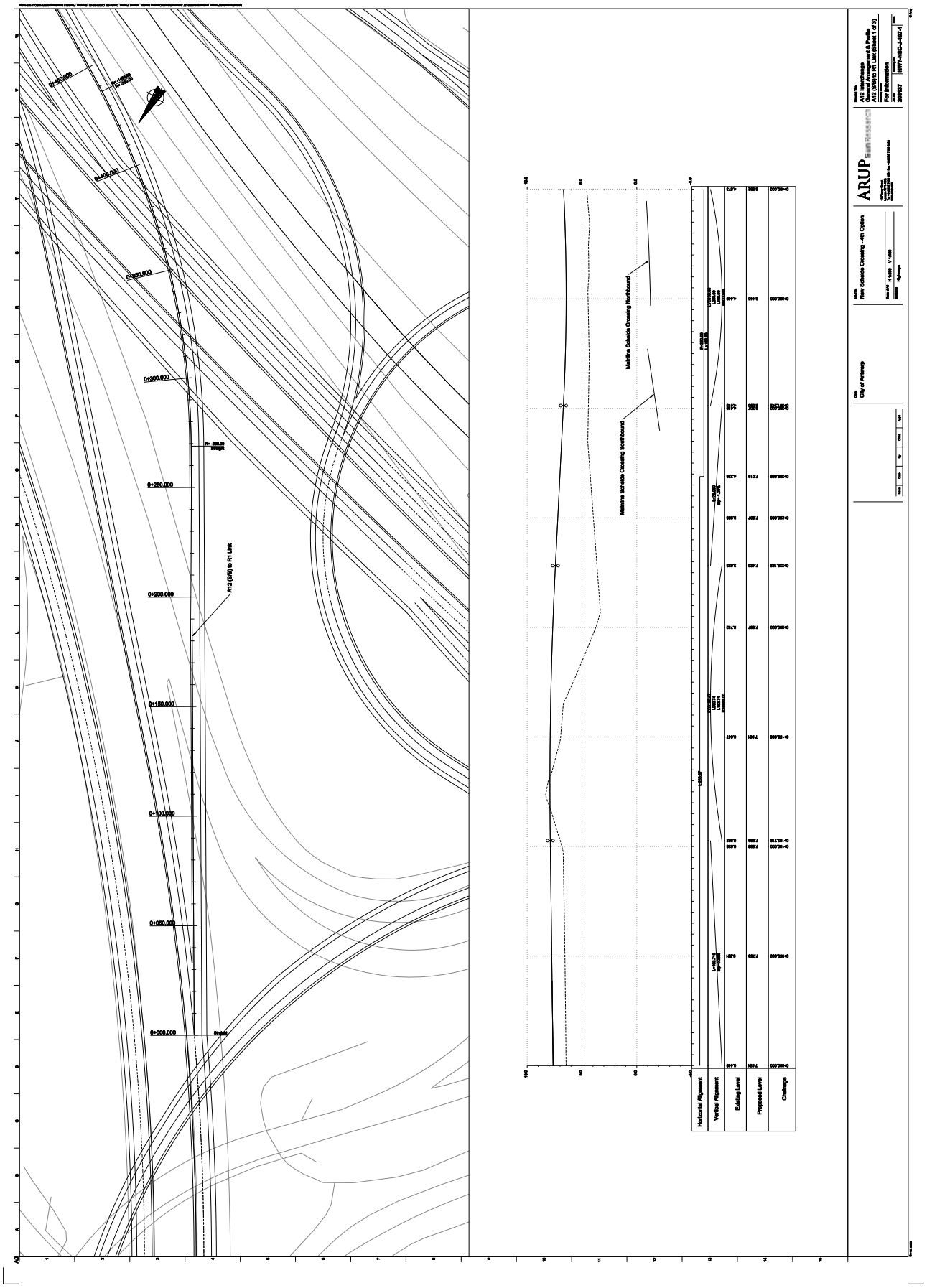
Job No: 269137

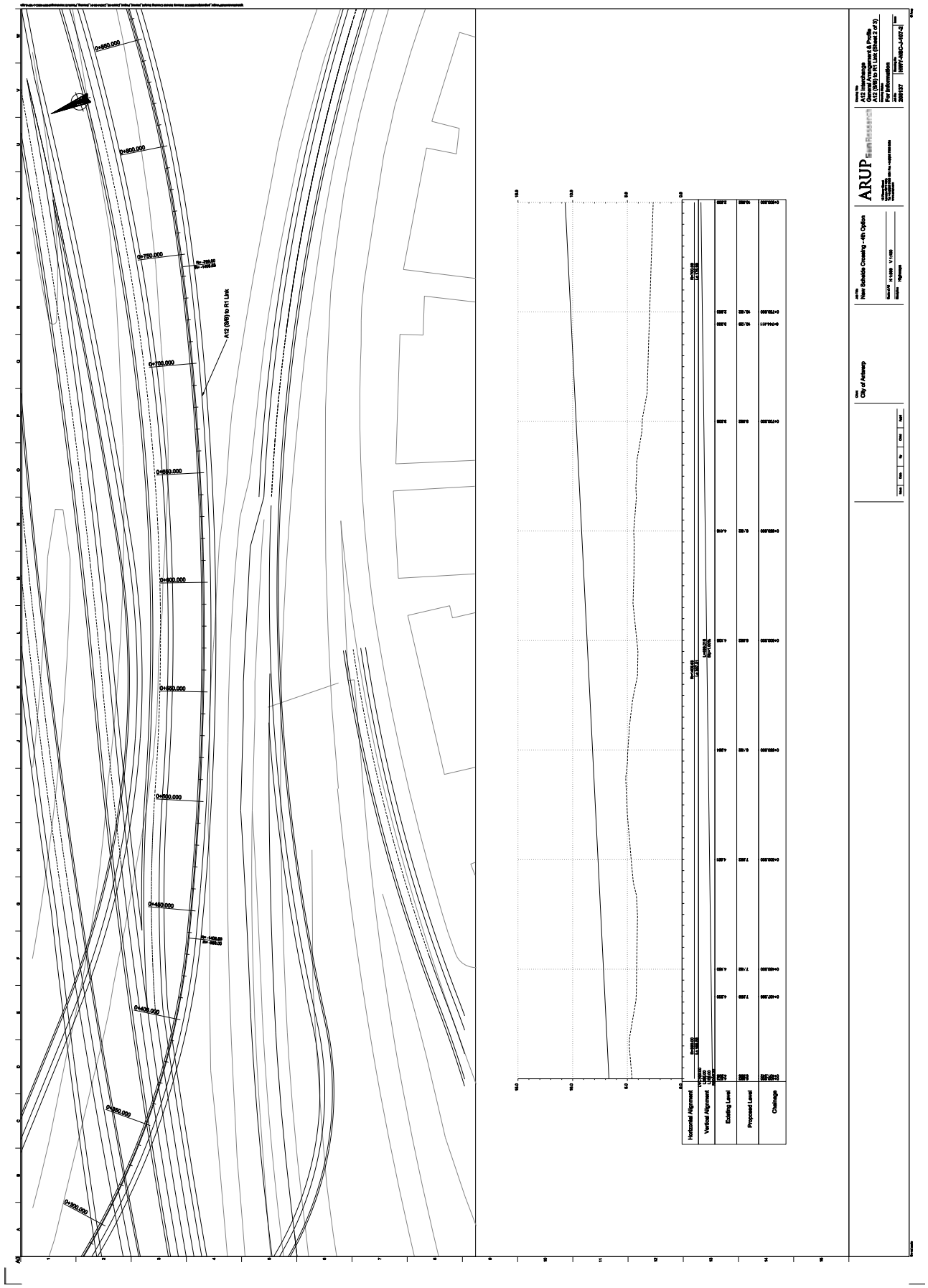
Drawing No: HWY-NSC-J-104-4

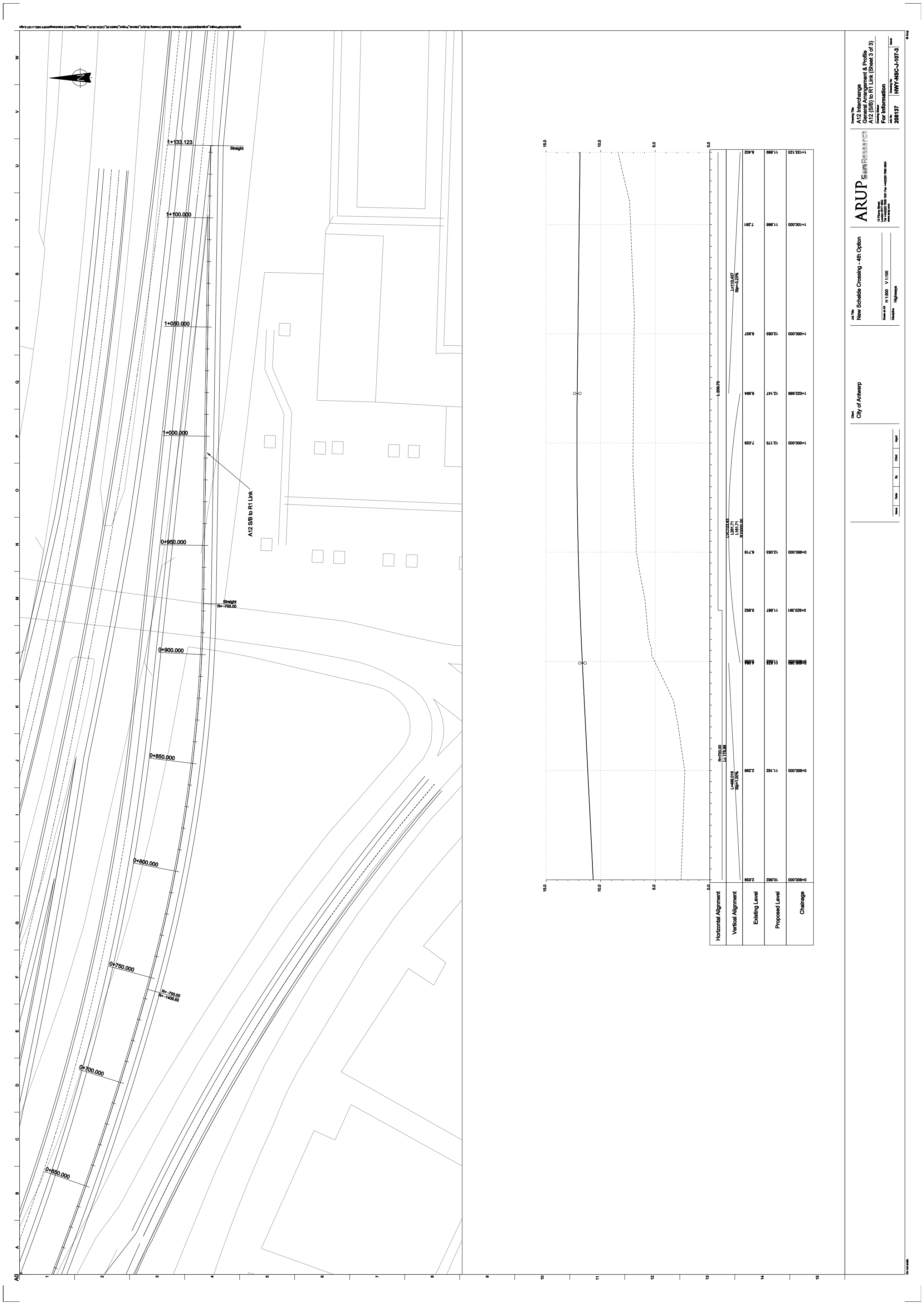

A12 Northbound
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
ARUP

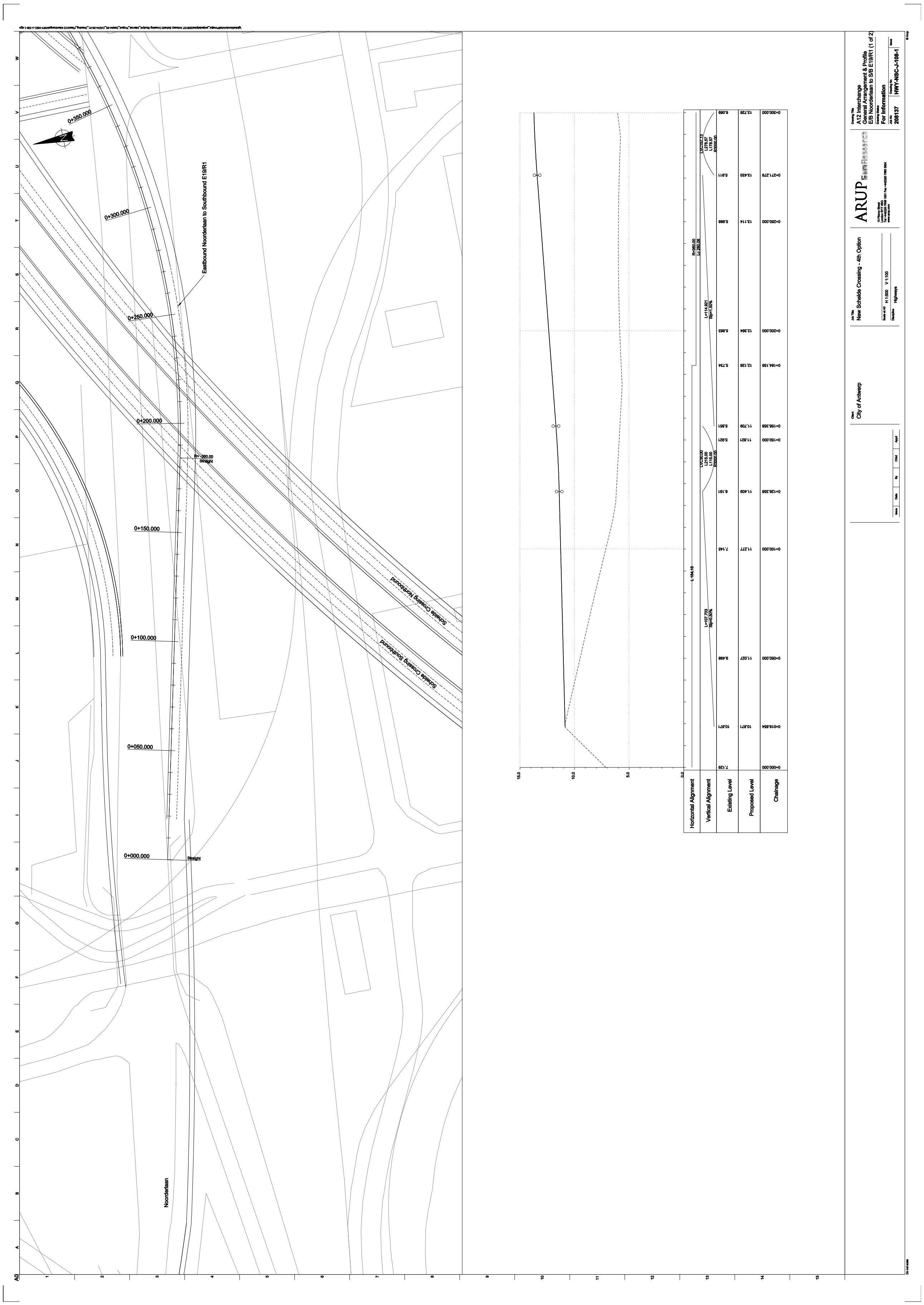

A12 Northbound
Noordenlaan to A12 Northbound
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
A12 Interchange
Detail Arrangement & Profile
A12 Northbound (Sheet 2 of 2)
City of Antwerp
Near Schelde Crossing - 4th Option
ARUP

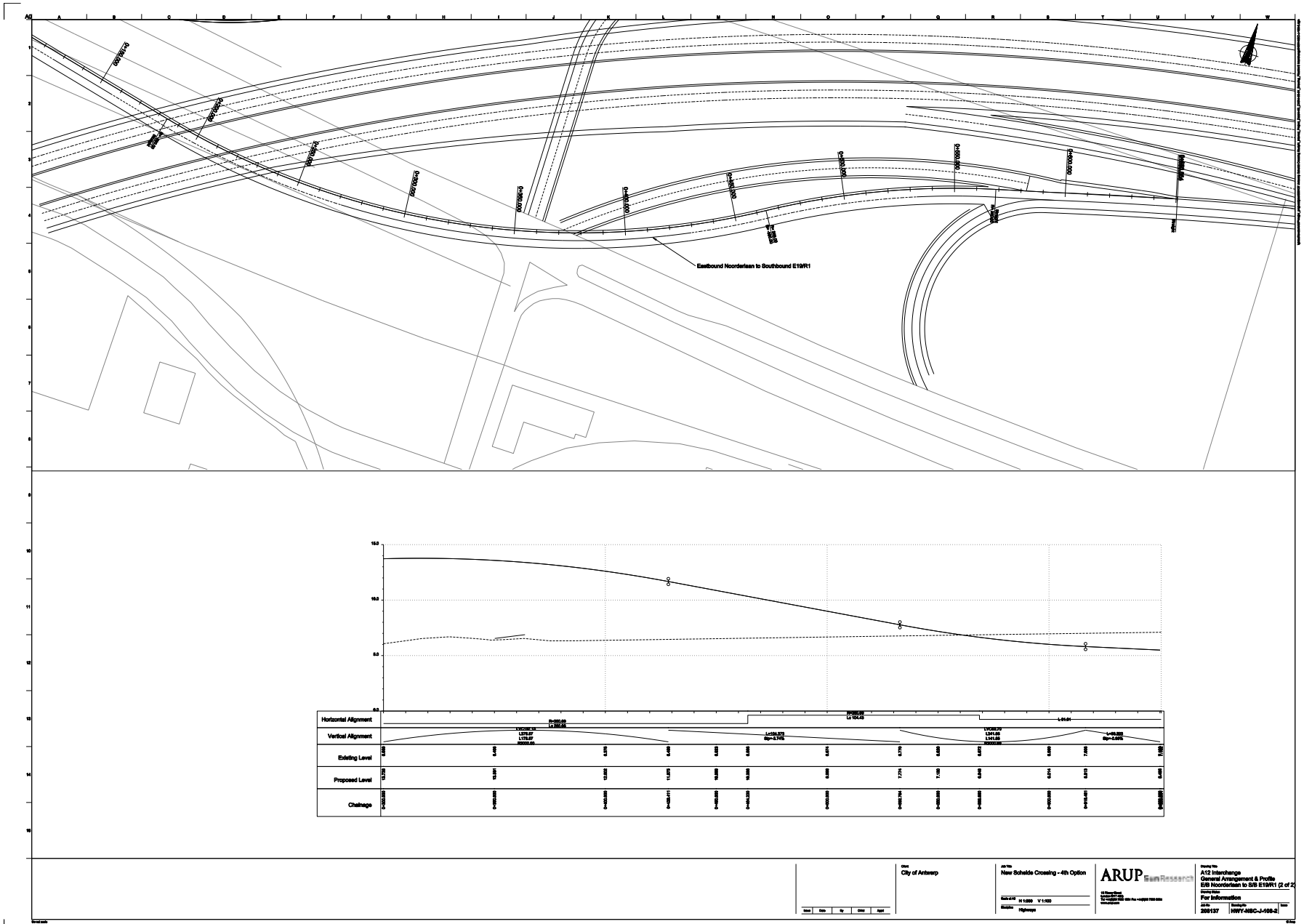

A12 (S/B) to Schelde Crossing Link
A12
A12 (N/B) to Port Link
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
New Schelde Crossing - 4th Option
ARUP


0+360.000
0+300.000
0+250.000
0+200.000
0+150.000
0+100.000
0+050.000
0+000.000
A12 (SR) to R1 Link
Ringway
Matrline Schelde Crossing Northbound
Matrline Schelde Crossing Southbound
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
Near Schelde Crossing - 4th Option
ARUP
A12 Interchange
A12 (SR) to R1 Link (Sheet 4 of 9)
For Information
266137
HWY-ABD-A-497-4

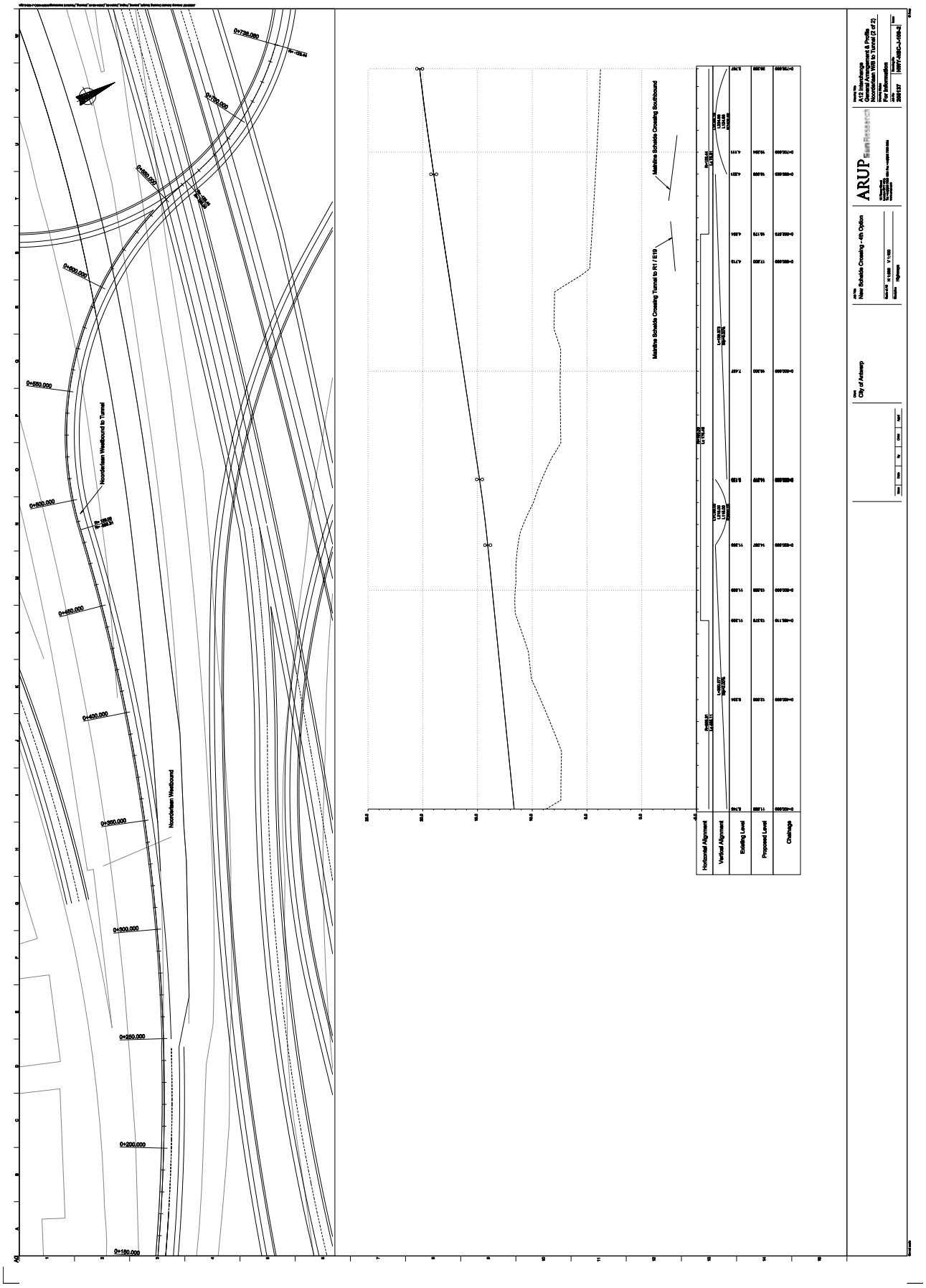

A12 Interchange
Near Schelde Crossing - 4th Option
City of Antwerp
ARUP
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage

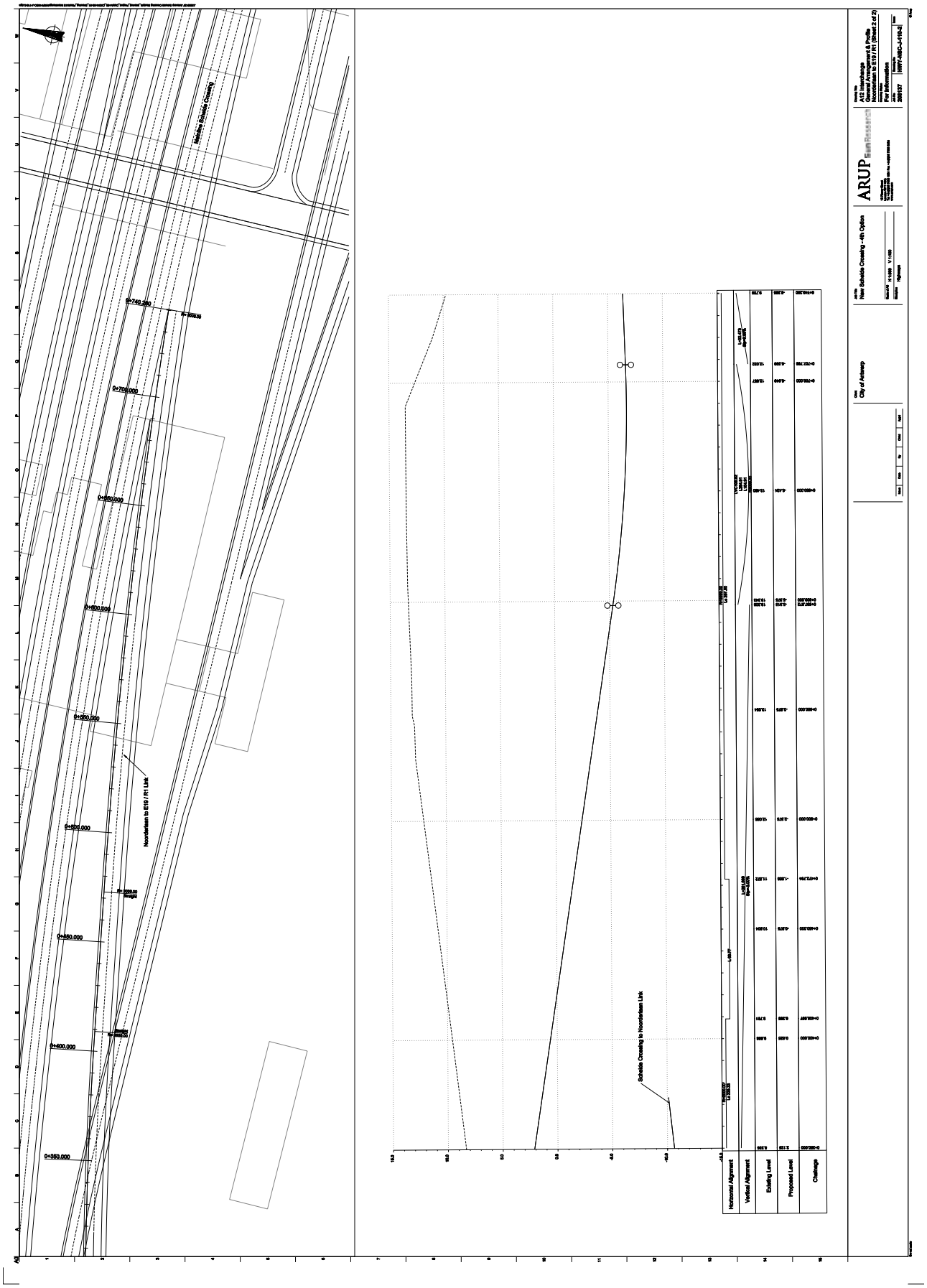

A12 S/8 to R1 Link
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
New Scheldt Crossing - 4th Option
ARUP
For Information

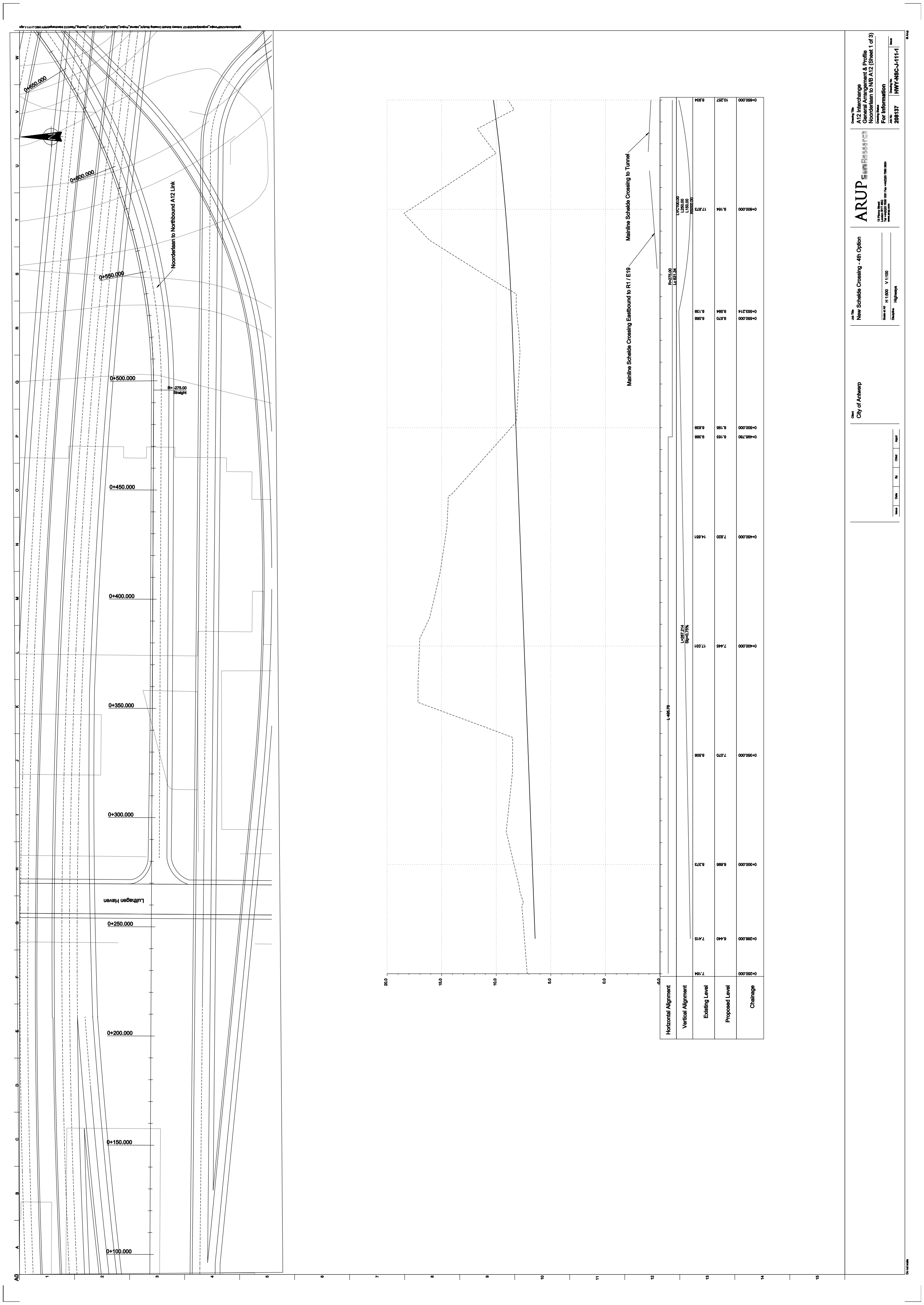


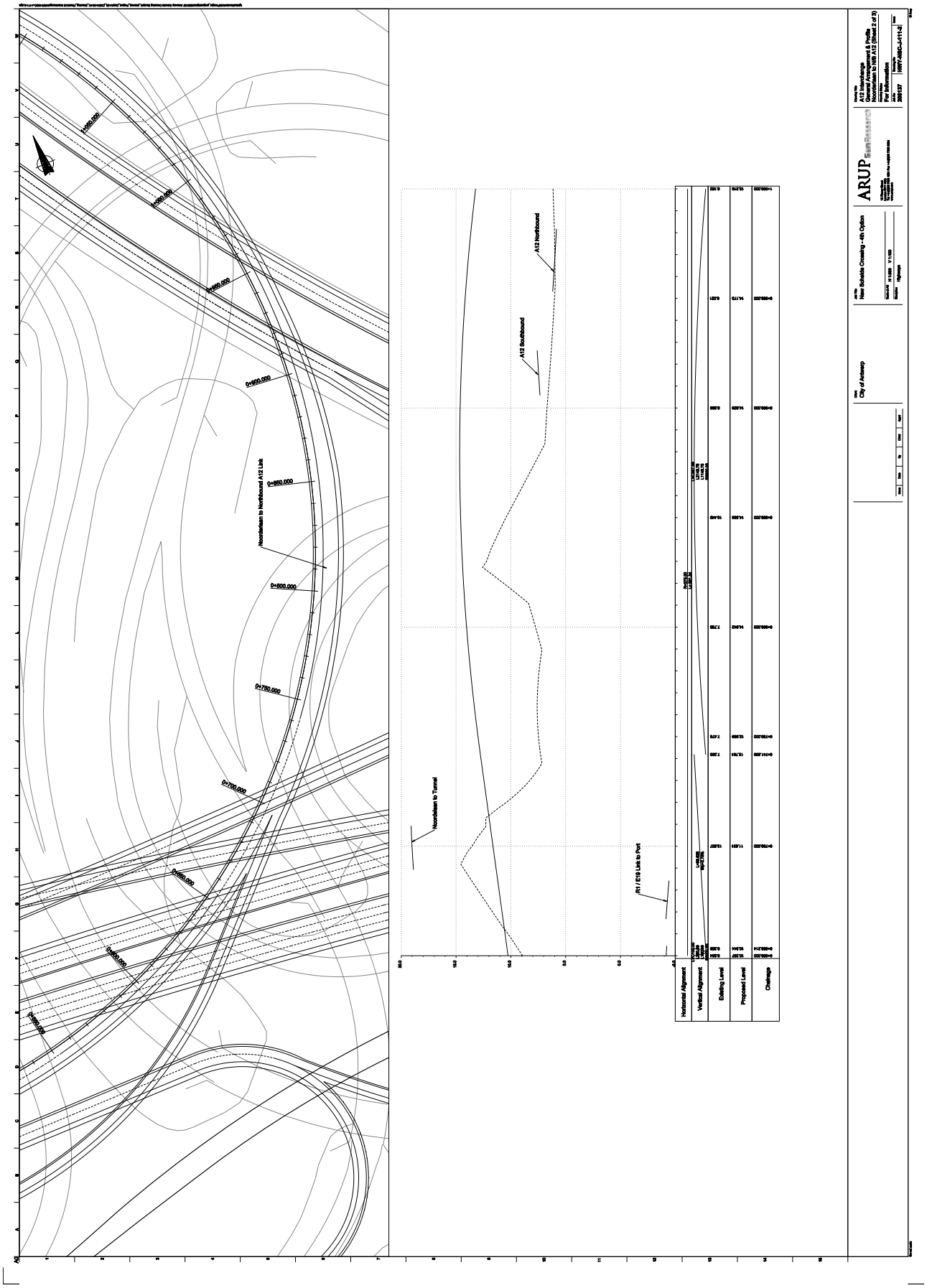

Eastbound Noorderlaan to Southbound E19/R1
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
New Schelde Crossing - 4th Option
ARUP
A12 Interchange
General Arrangement & Profile
E/B Noorderlaan to S/B E19/R1 (2 of 2)
For information
269137
HWY-HSC-J-105-2

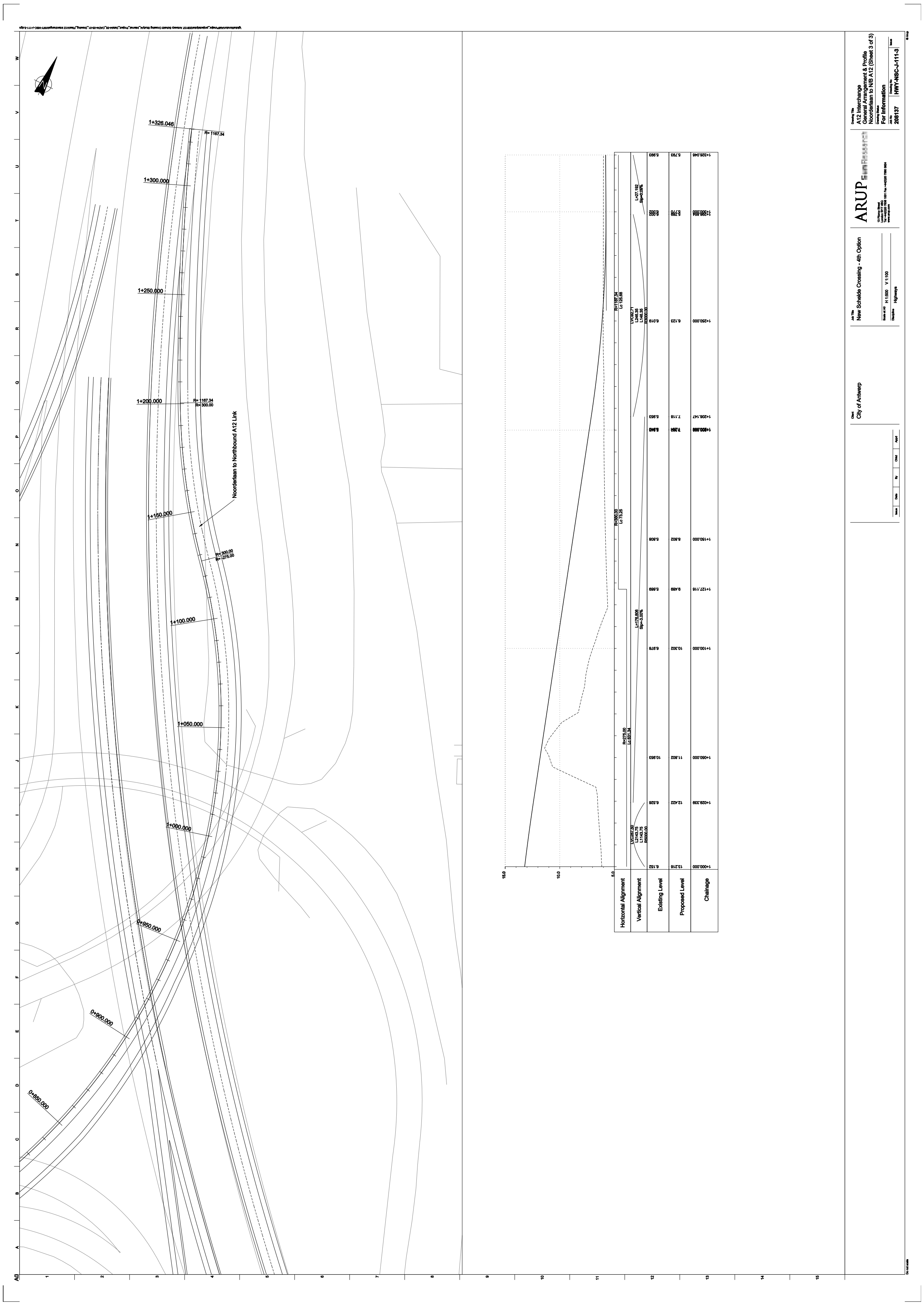

Noordelijke Westbound to Schelde Crossing
Noordelijke Westbound
0+400.000
0+350.000
0+300.000
0+250.000
0+200.000
0+150.000
0+100.000
0+050.000
0+000.000
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
Near Schelde Crossing - 4th Option
ARUP
A12 Interchange
General Arrangement & Profile
Noordelijke Westbound to Schelde (1 of 2)
For Information
HWY-ABD-A-009-d


Noordelijke Westbound to Tunnel
Noordelijke Westbound
Matrilne Schelde Crossing Southbound
Matrilne Schelde Crossing Tunnel to R1 / E19
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
Near Schelde Crossing - 4th Option
ARUP
A12 Interchange
General Arrangement & Profile
Noordelijke Westbound to Tunnel (1 of 2)
For Information
HWY-ABD-A-009-2

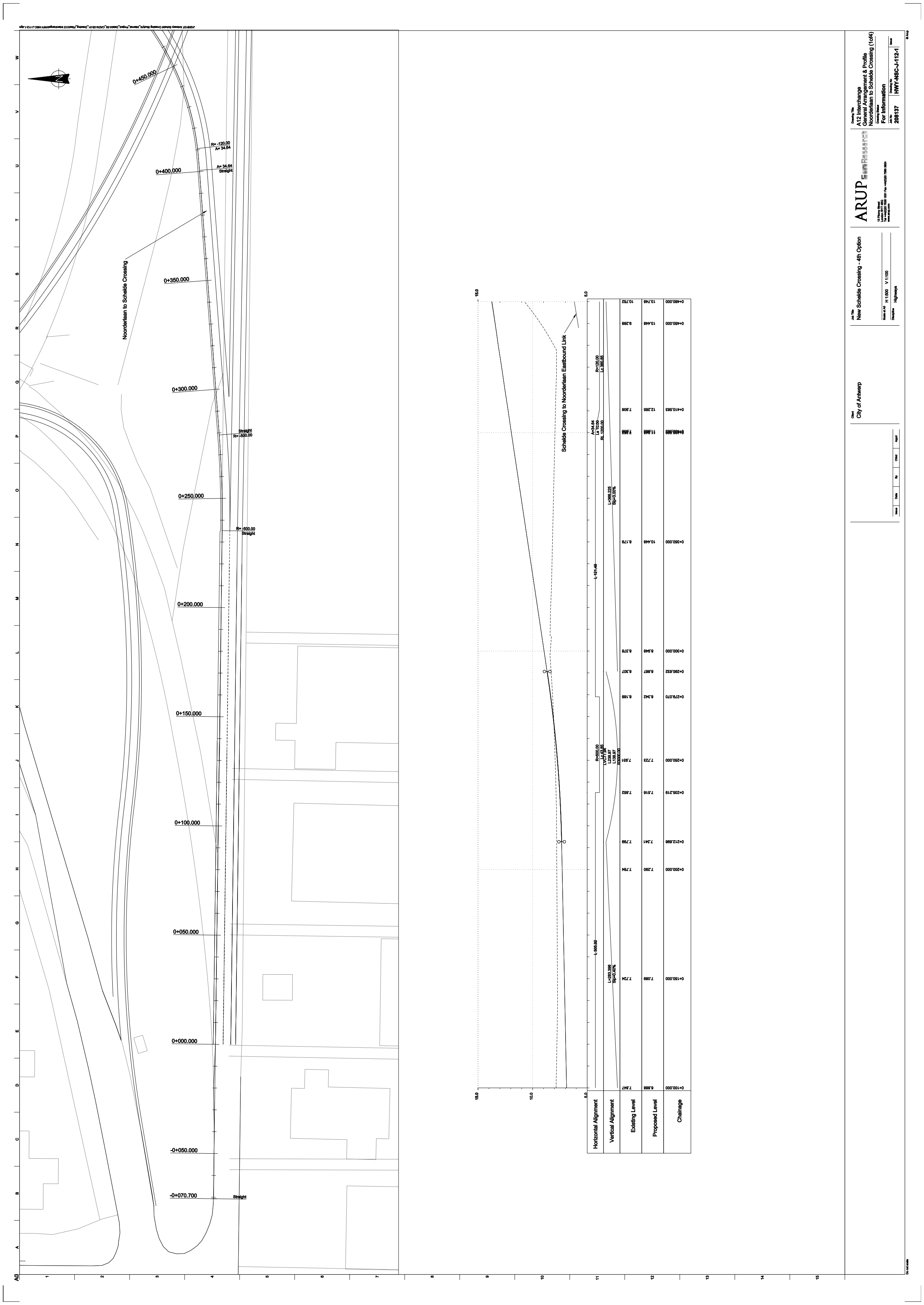

Noordelaan to E19 / R1 Link
Schelde Crossing to Noordelaan Link
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
A12 Interchange
City of Antwerp
ARUP

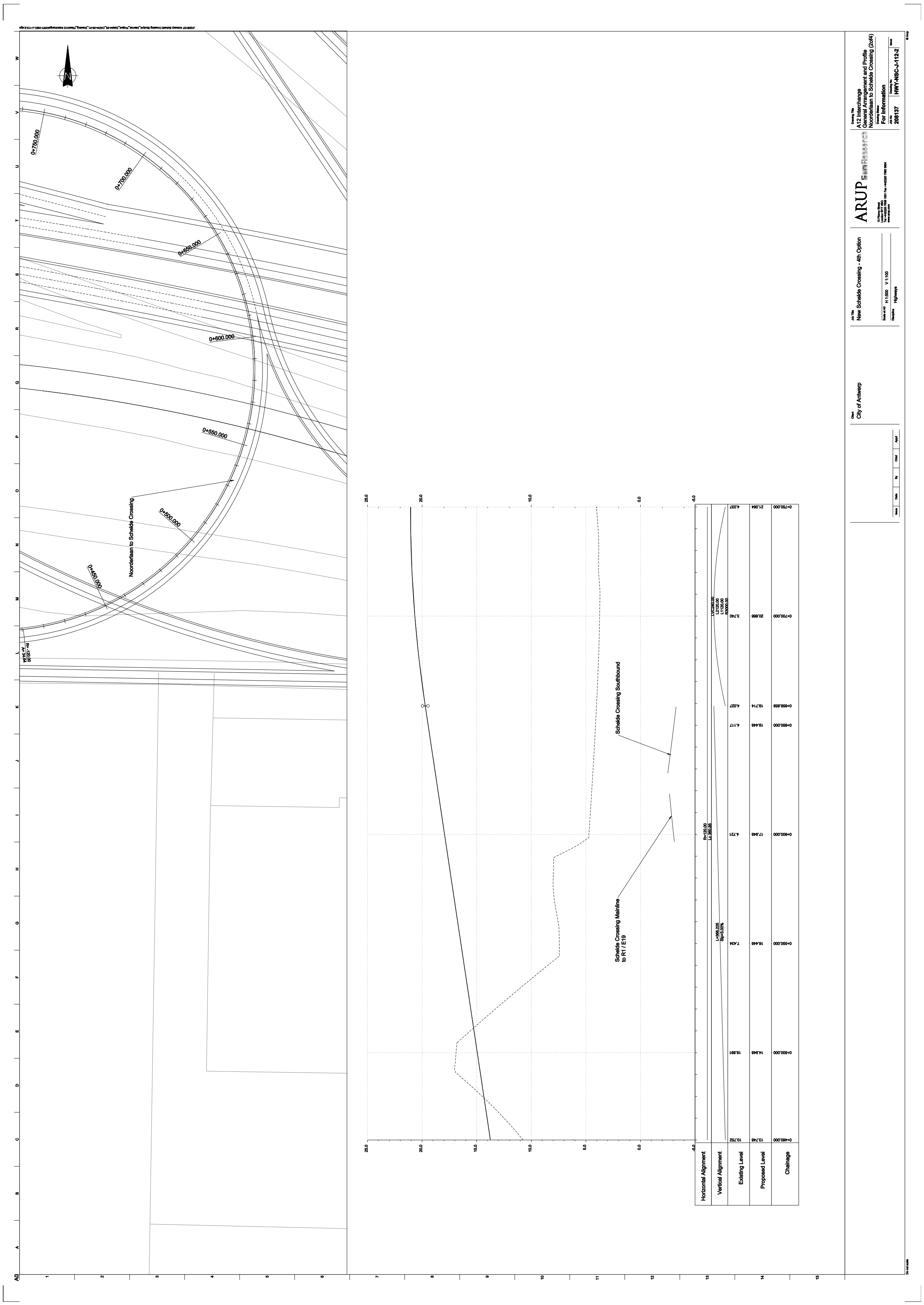

ARUP
City of Antwerp
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage


A12 Northbound
A12 Southbound
Noordelaan to Tunnel
R1 / E19 Link to Port
Noordelaan to Northbound A12 Link
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
A12 Interchange
General Arrangement A12 Profile
Noordelaan Junction A12 (Sheet 2 of 3)
ARUP
City of Antwerp
Near Schelde Crossing - 4th Option

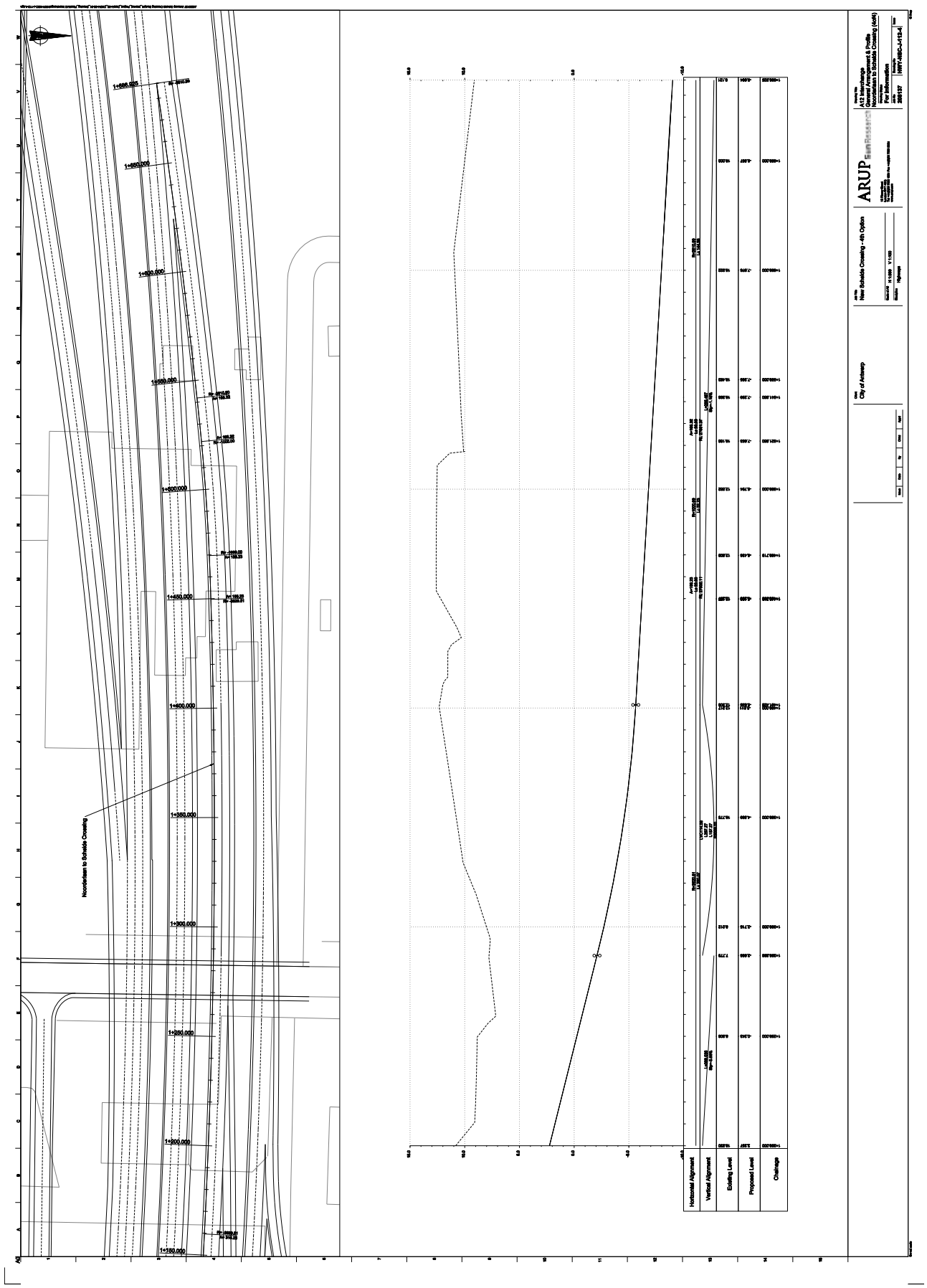


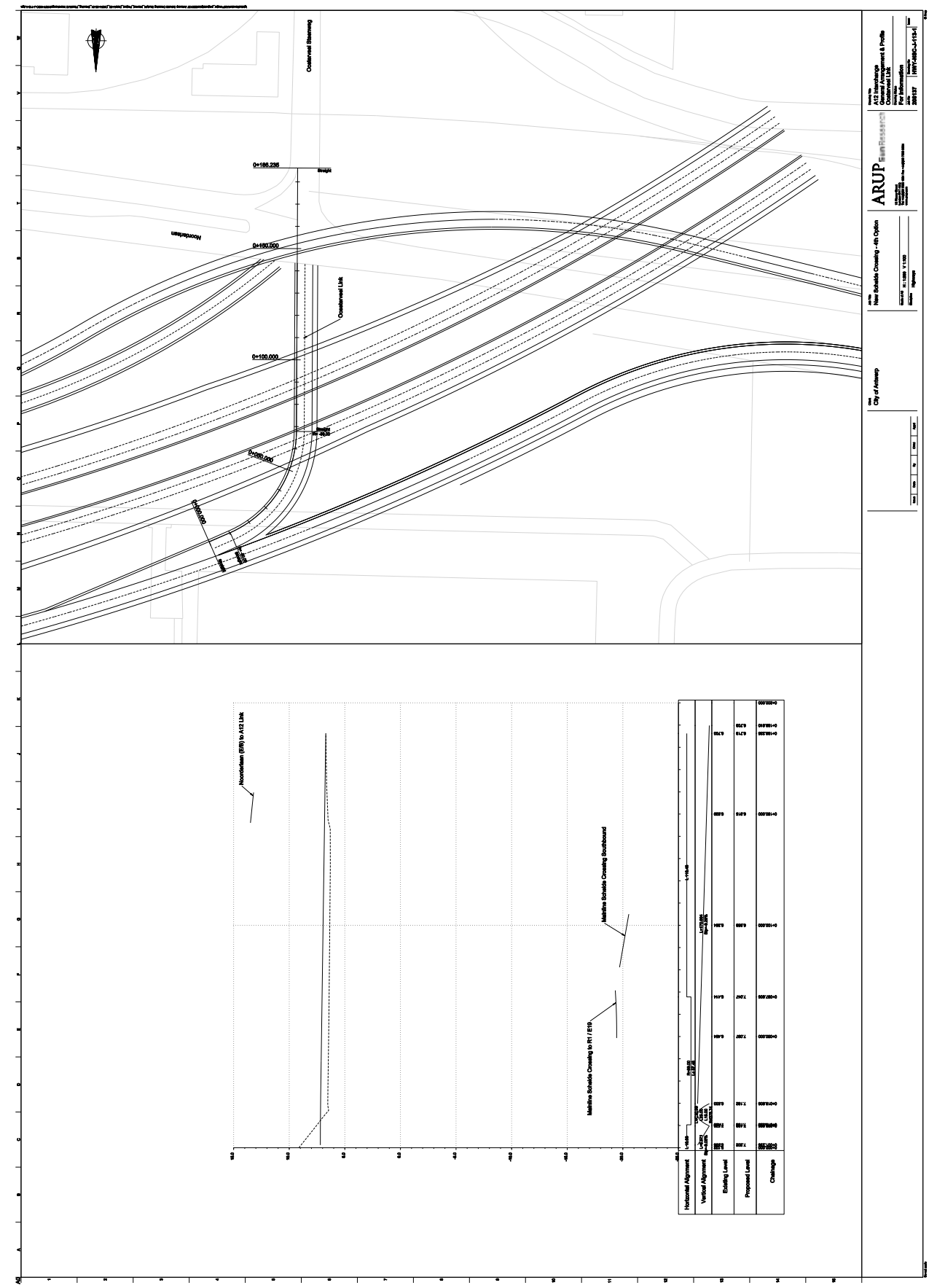
1+326.046
1+300.000
1+250.000
1+200.000
1+150.000
1+100.000
1+050.000
1+000.000
0+950.000
0+900.000
0+850.000
Noorderlaan to Northbound A12 Link
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
New Scheldt Crossing - 4th Option
A12 Interchange
General Arrangement & Profile
Noorderlaan to N/B A12 (Sheet 3 of 3)
For Information
ARUP

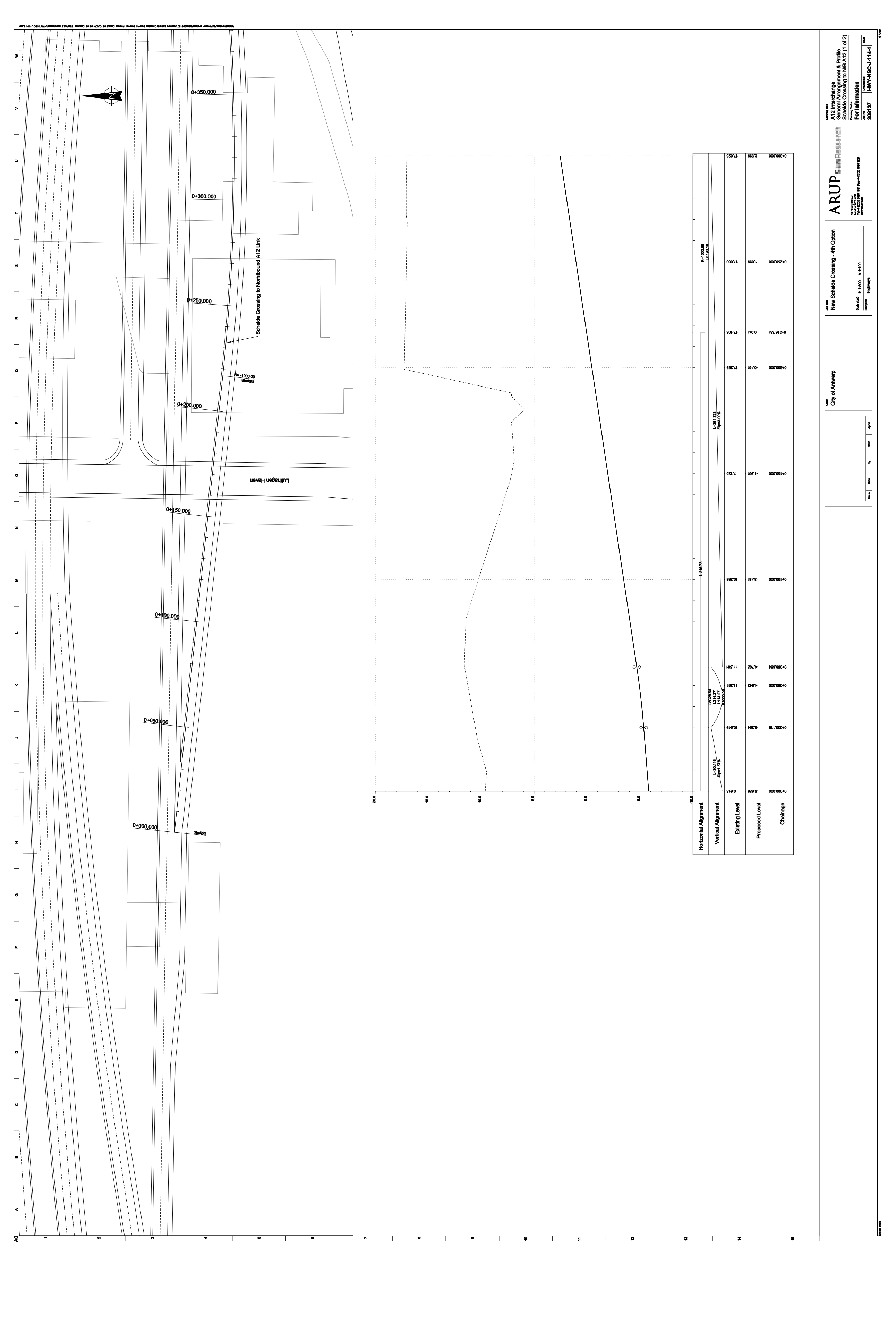

Noorderlaan to Schelde Crossing
0+450.000
0+400.000
0+350.000
0+300.000
0+250.000
0+200.000
0+150.000
0+100.000
0+050.000
0+000.000
-0+050.000
-0+070.700
R= -120.00
A= 34.64
Straight
R= -500.00
Schelde Crossing to Noorderlaan Eastbound Link
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
L=368.225
Slp=3.00%
L=283.396
Slp=0.40%
R=120.00
Lc 360.85
R=500.00
L 121.49
L 305.92
Client
City of Antwerp
Job Title
New Schelde Crossing - 4th Option
Scale at A0
H 1:500 V 1:100
Discipline
Highways
ARUP
Drawing Title
A12 Interchange
General Arrangement & Profile
Noorderlaan to Schelde Crossing (1of4)
Drawing Status
For Information
Job No
208137
Drawing No
HWY-NSC-J-112-1
Do not scale

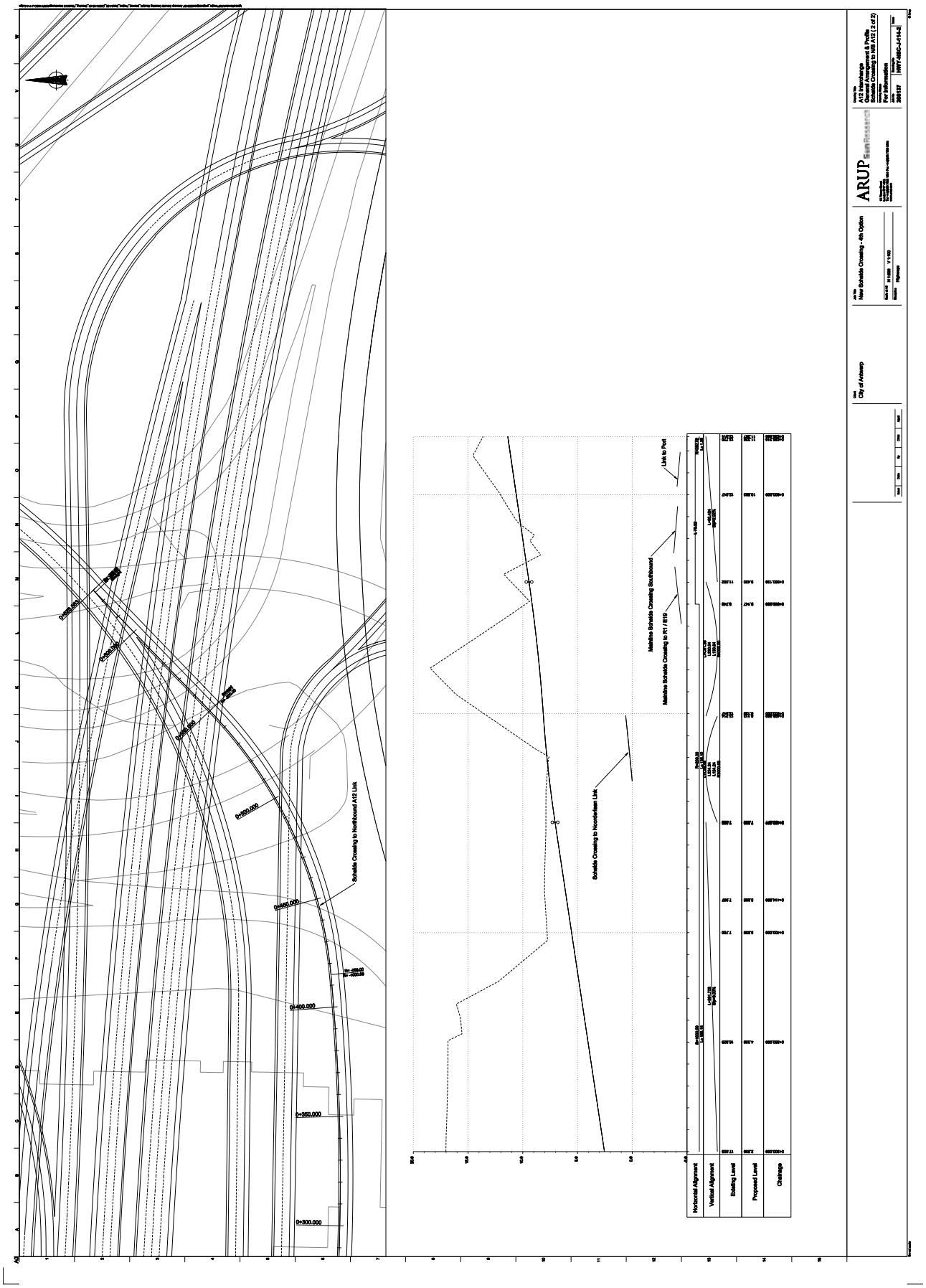

Drawing Title
A12 Interchange
General Arrangement and Profile
Noorderlaan to Schelde Crossing (2of4)
Drawing Status
For Information
Job No
208137
Drawing No
HWY-NSC-J-112-2
Issue
ARUP
13 Fitzroy Street
London W1T 4BQ
Tel +44(0)20 7636 1531 Fax +44(0)20 7580 3924
www.arup.com
Job Title
New Schelde Crossing - 4th Option
Scale at A0
H 1:500 V 1:100
Discipline
Highways
Client
City of Antwerp
Issue
Date
By
Chkd
Appd
© Arup
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage

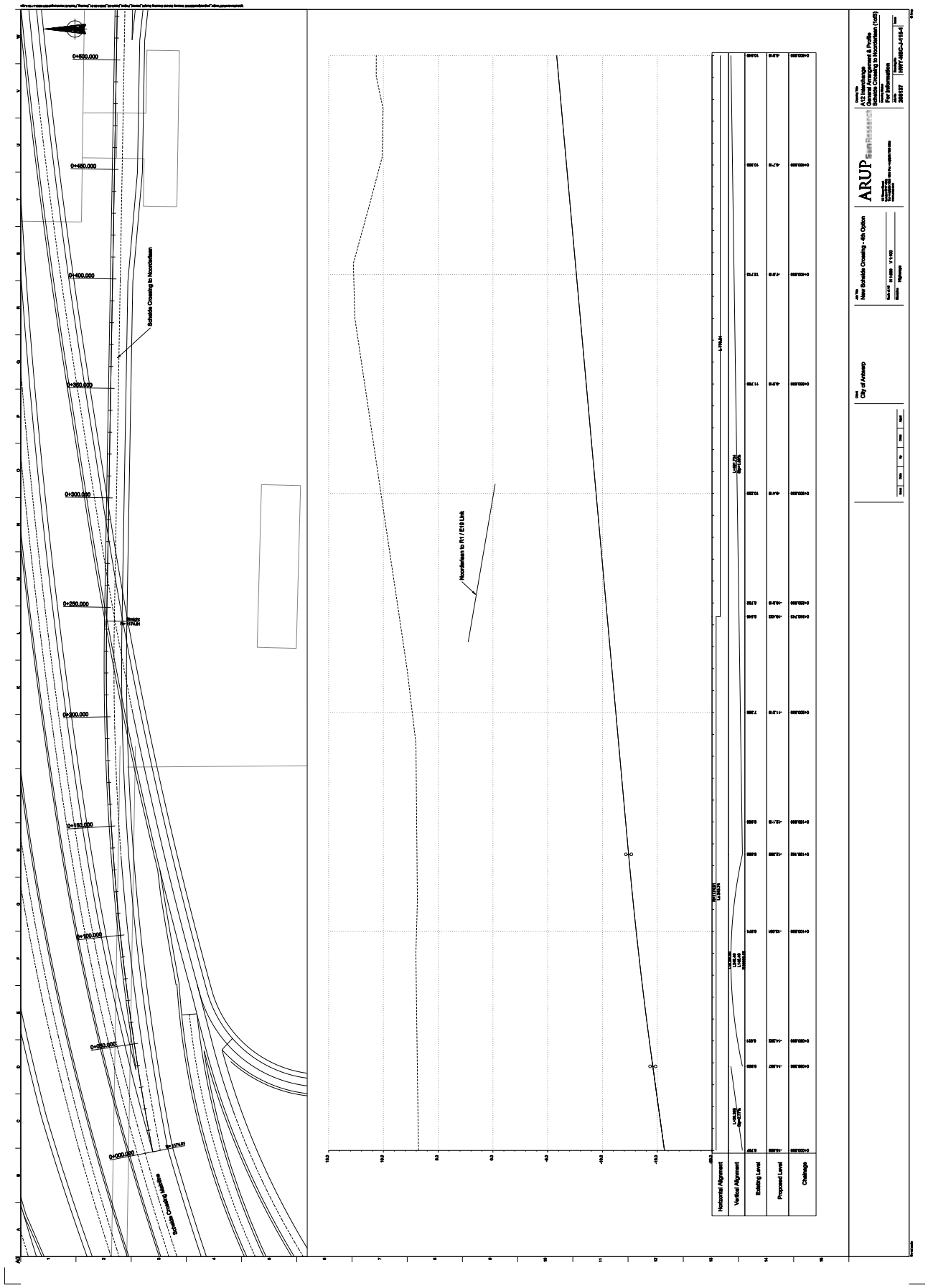

1+250.000
1+200.000
1+150.000
1+100.000
1+050.000
1+000.000
0+950.000
0+900.000
0+850.000
0+800.000
0+750.000
0+700.000
Noordenlaan to Schelde Crossing
Noordenlaan to A12 Link
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
Near Schelde Crossing - 4th Option
ARUP
A12 Interchange
Ground Arrangement & Profile
Noordenlaan to Schelde Crossing (GA4)
For Information
HWY-ARD-J-413-3

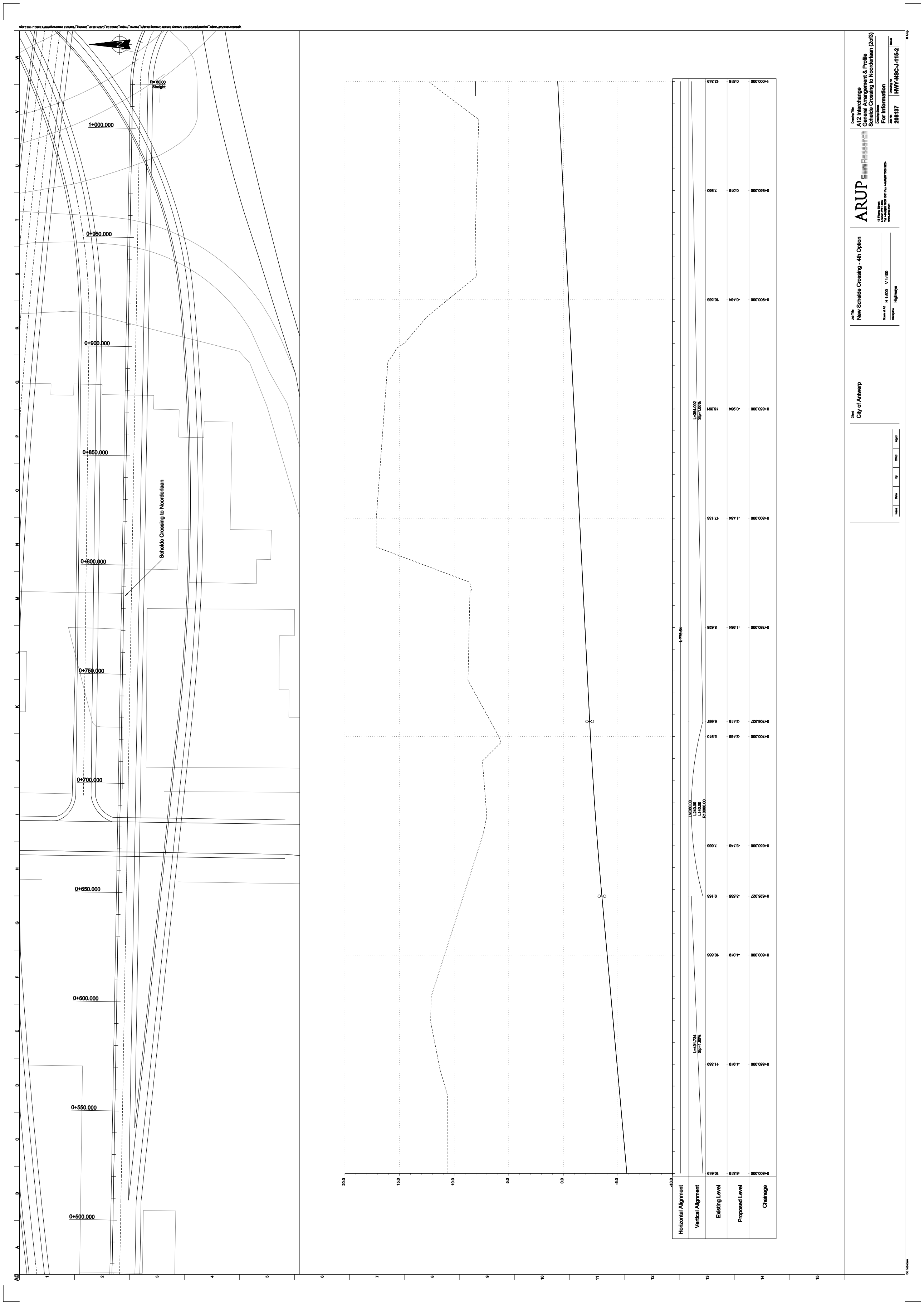

Noordentram to Schelde Crossing
1+600.000
1+550.000
1+500.000
1+450.000
1+400.000
1+350.000
1+300.000
1+250.000
1+200.000
1+150.000
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
Noor Schelde Crossing - 4th Option
ARUP
A12 Interchange
Ground Arrangement & Profile
Noordentram to Schelde Crossing (4x4)
For Information
266137
HWY-ABD-J-413-4

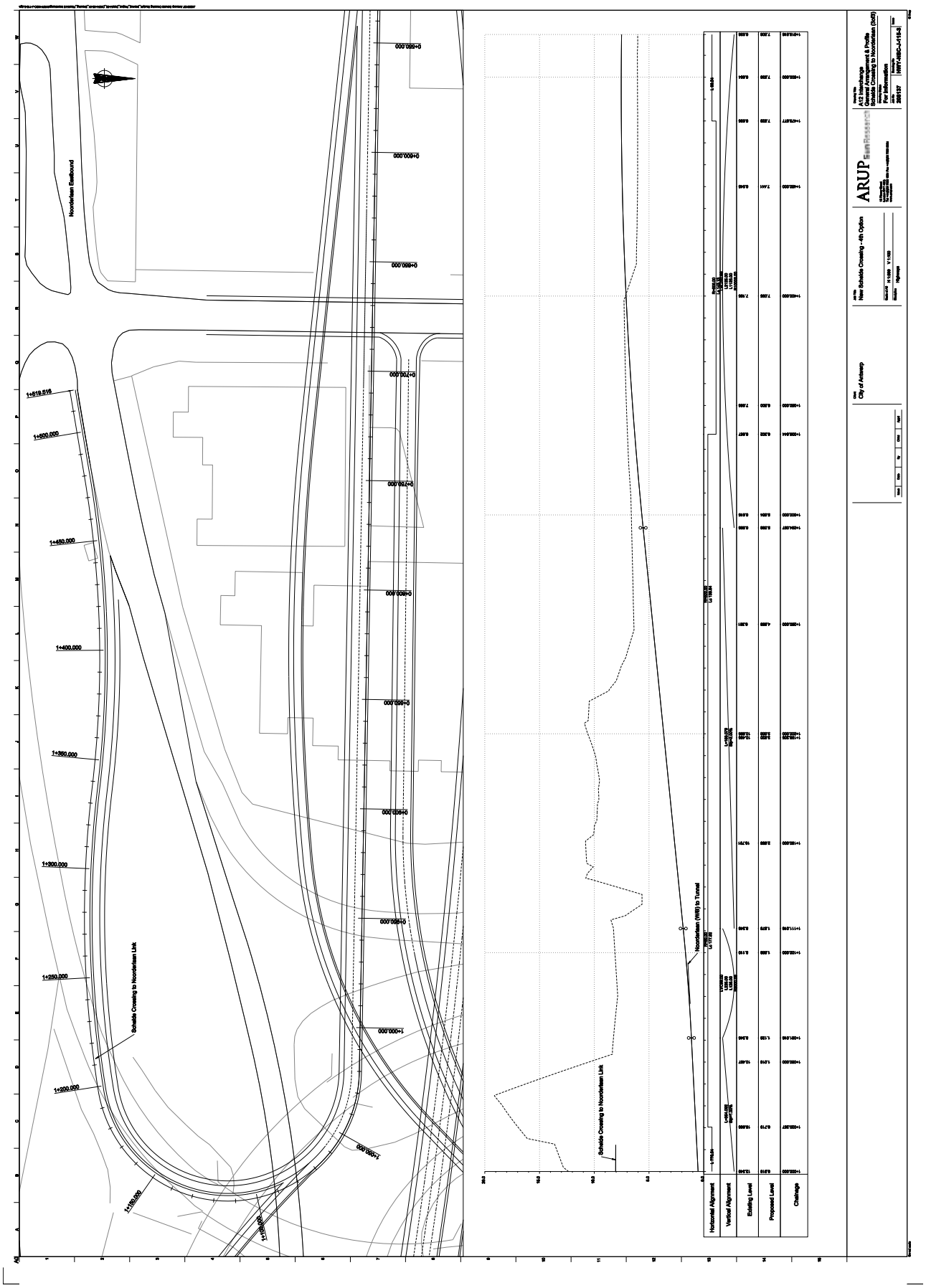

Oosterveel Steenweg
Noordenlaan
Oosterveel Link
0+186.236
0+180.000
0+100.000
0+060.000
0+020.000
Noordenlaan (E19) to A12 Link
Meldihe Schelde Crossing Southbound
Meldihe Schelde Crossing to R1 / E19
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
ARUP
A12 Interchange
General Arrangement & Profile
Oosterveel Link
For Information
City of Antwerp
Near Schelde Crossing - 4th Option

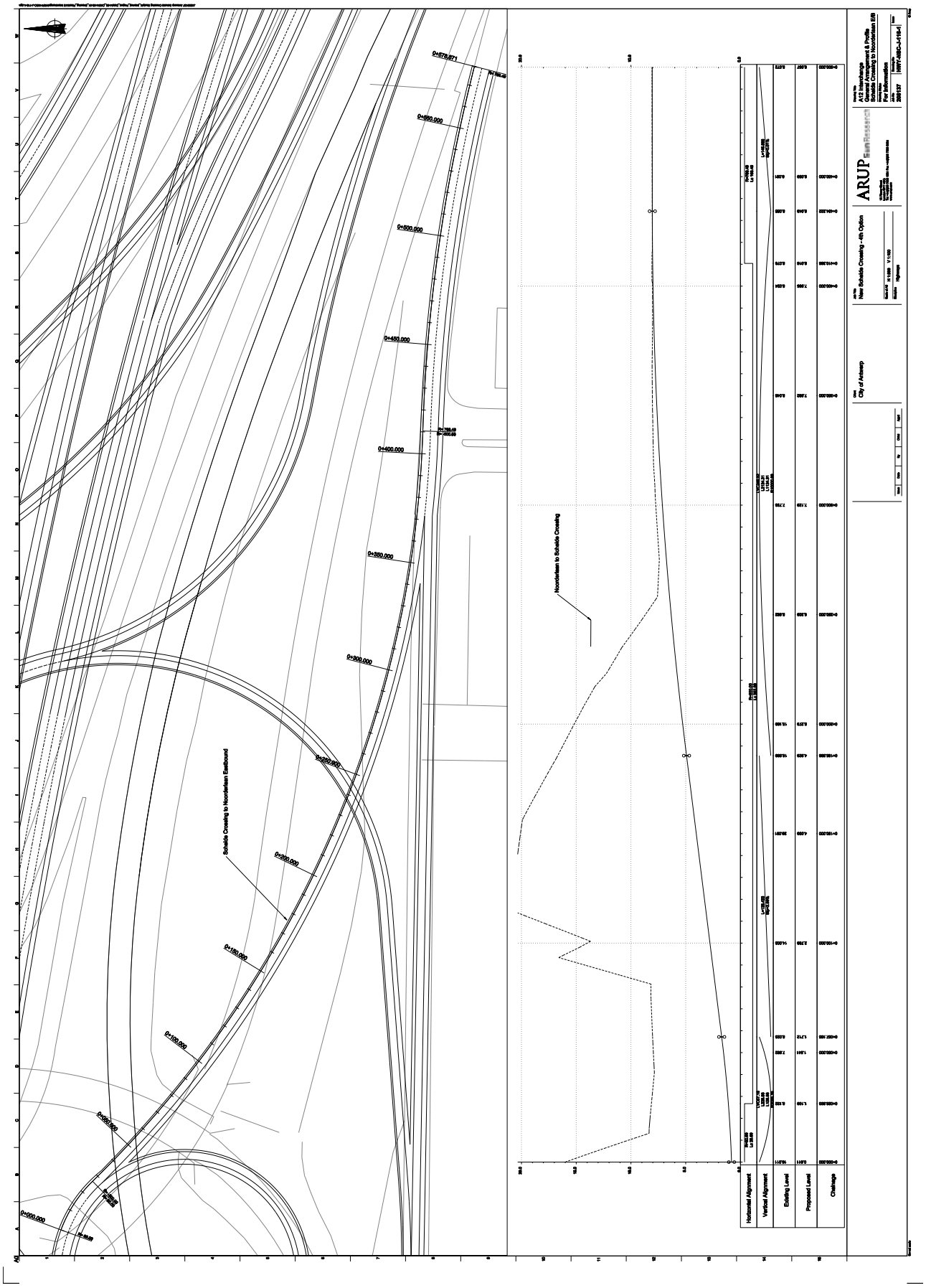

A12 Interchange
General Arrangement & Profile
Schelde Crossing to N/B A12 (1 of 2)
For Information
208137
HWY-NSC-J-114-1
ARUP
New Schelde Crossing - 4th Option
H 1:500 V 1:100
Highways
City of Antwerp
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
Schelde Crossing to Northbound A12 Link

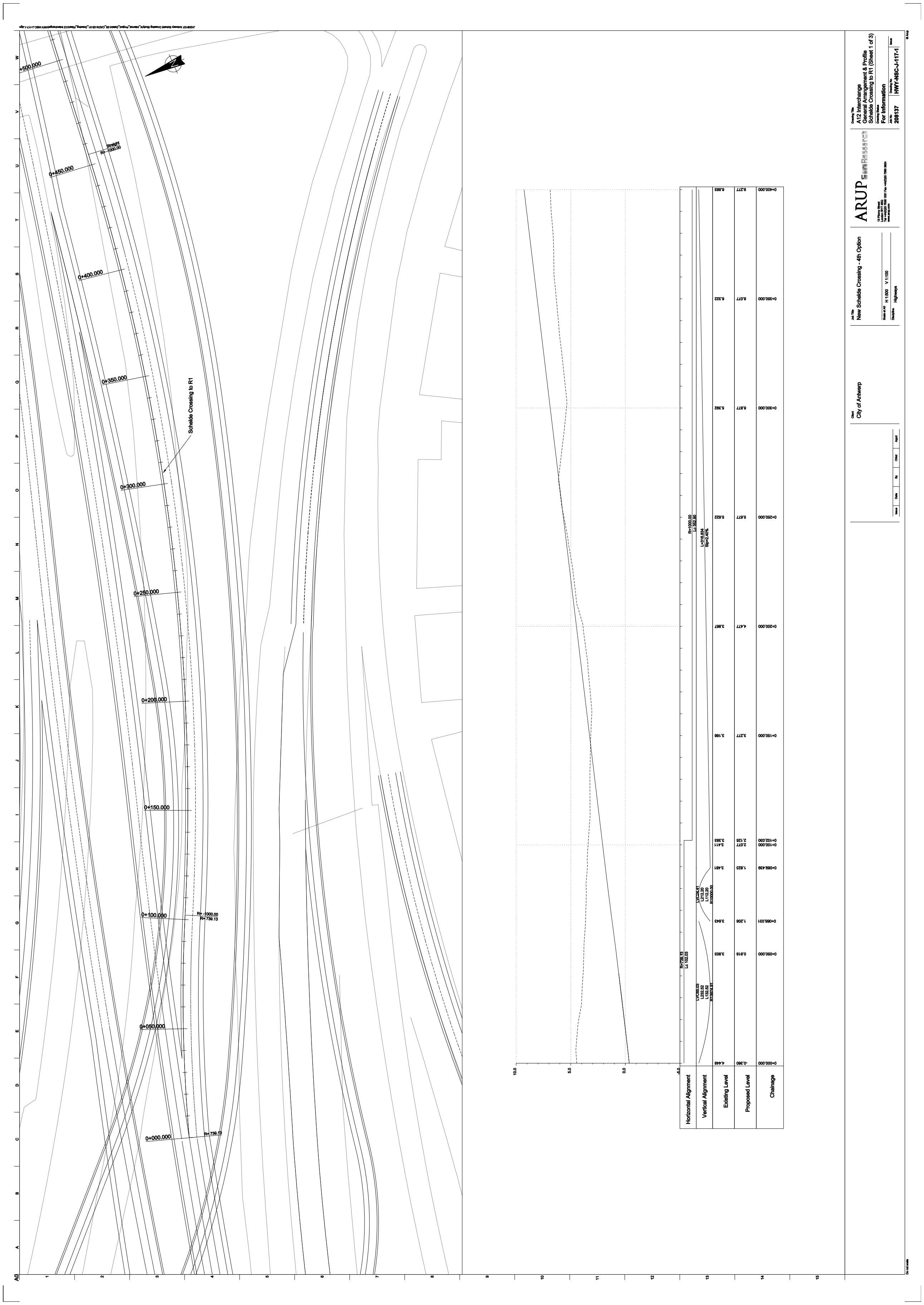

Schelde Crossing to Northbound A12 Link
Schelde Crossing to Noorderlaan Link
Matsimo Schelde Crossing Southbound
Matsimo Schelde Crossing to R1 / E19
Link to Port
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
Near Schelde Crossing - 4th Option
ARUP
A12 Interchange
General Arrangement & Profile
Schelde Crossing to R1/E19 (1 of 2)
For Information
HWY-ABD-A1414-2

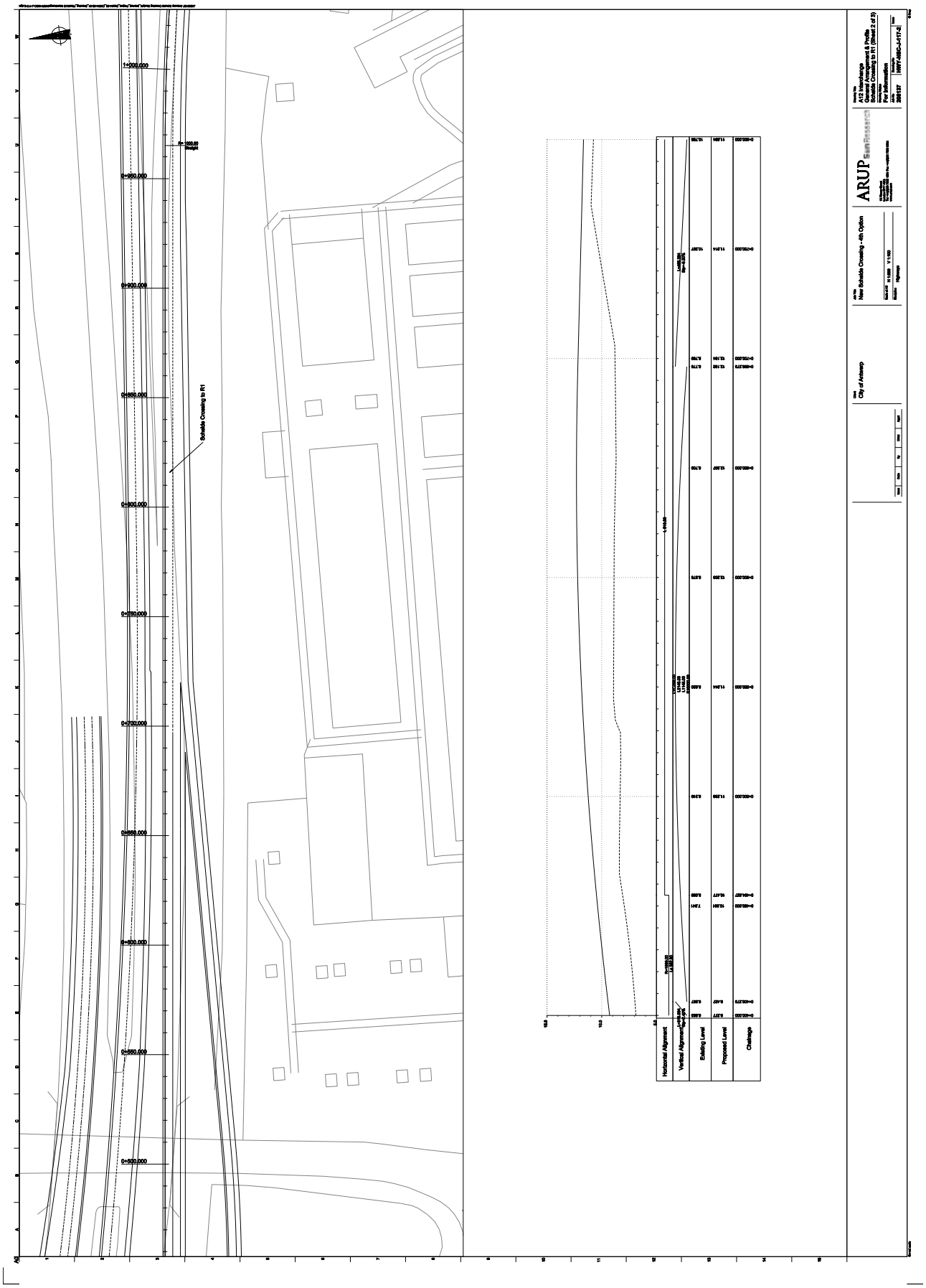

Schelde Crossing to Noorderlaan
Noorderlaan to R1 / E19 Link
Schelde Crossing Viaduct
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
ARUP
City of Antwerp
Near Schelde Crossing - 4th Option
A12 Interchange
Detailed Assessment & Profile
Schelde Crossing to Noorderlaan (1of2)
For Information
206137
HWY-ARD-J-419-d

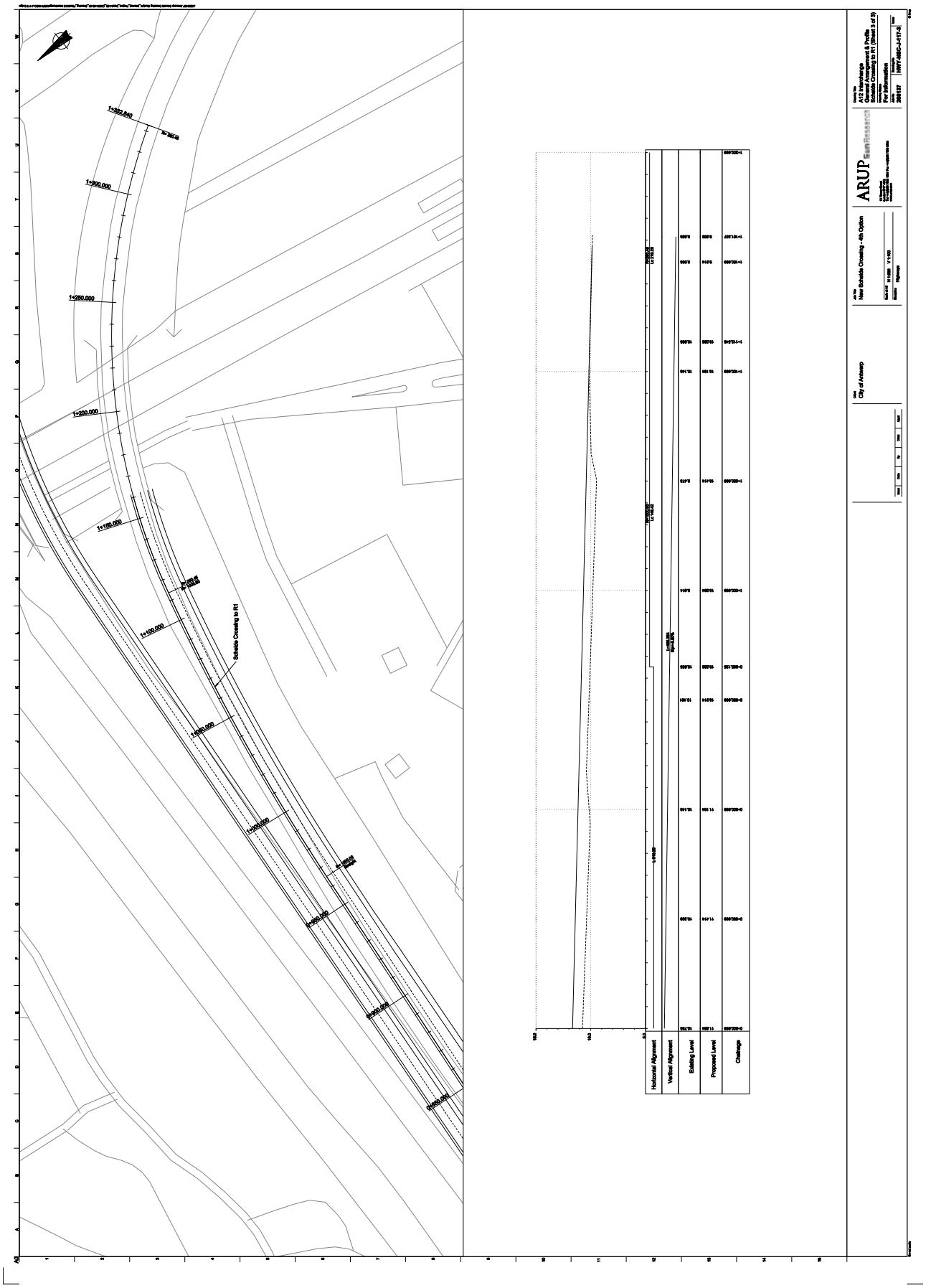

1+000.000
0+950.000
0+900.000
0+850.000
0+800.000
0+750.000
0+700.000
0+650.000
0+600.000
0+550.000
0+500.000
Scheldt Crossing to Noorderlaan
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
New Scheldt Crossing - 4th Option
ARUP
For Information

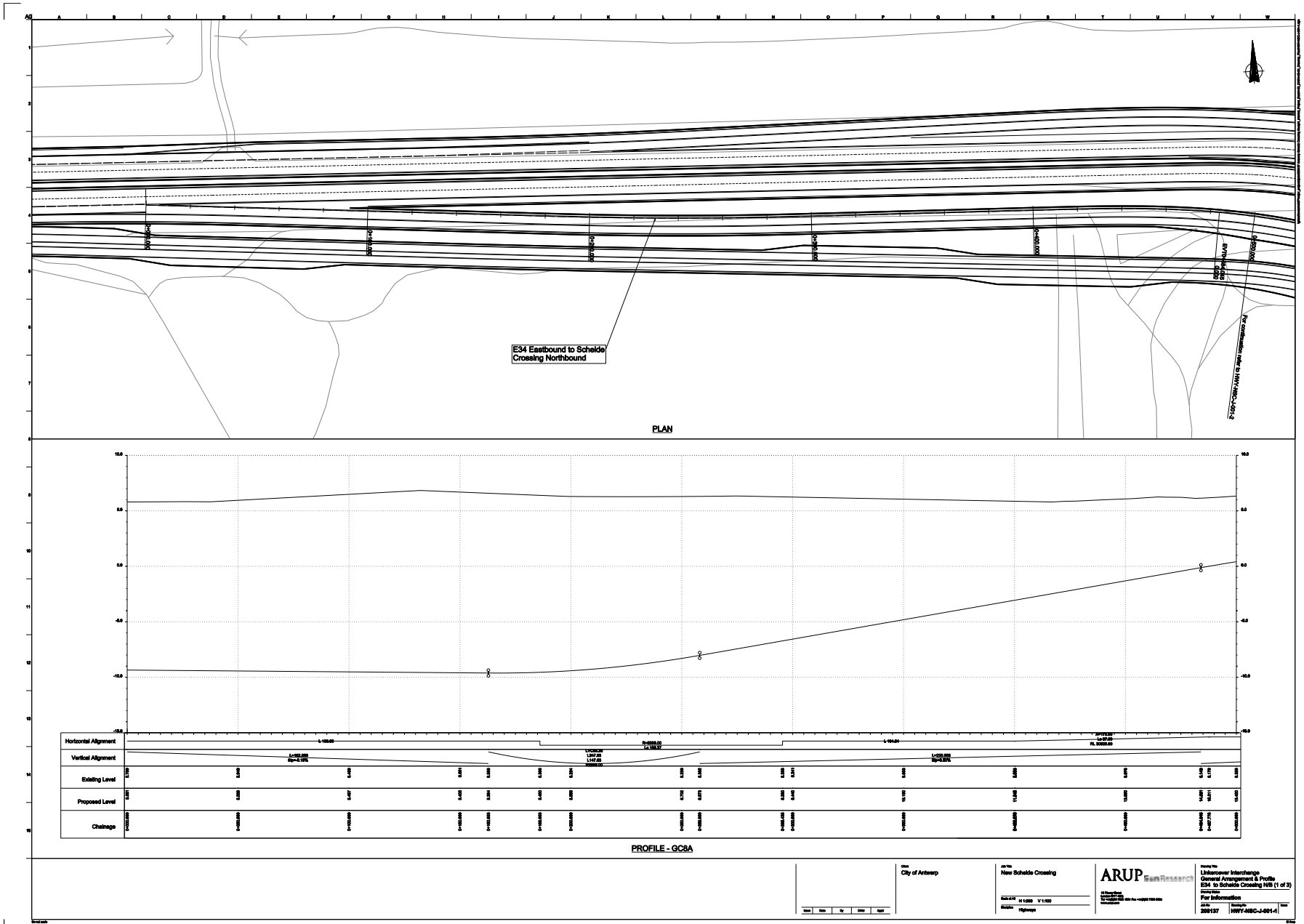

Noorderlaan Eastbound
Schelde Crossing to Noorderlaan Link
Noorderlaan (WB) to Tunnel
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
New Schelde Crossing - 4th Option
A12 Interchange
General Arrangement & Profile
Schelde Crossing to Noorderlaan (Sh20)
ARUP

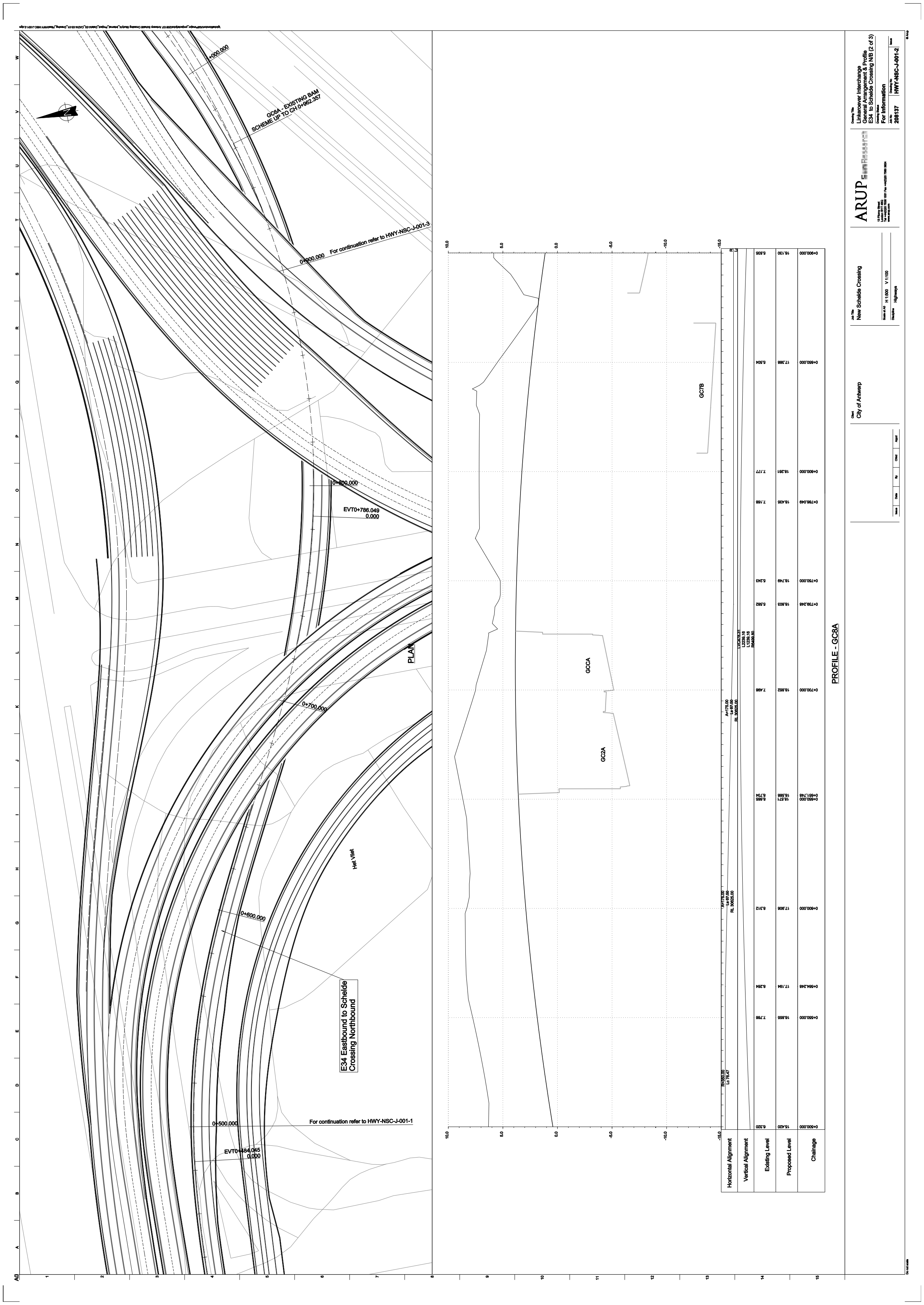

Schelde Crossing to Noorderlaan Eastbound
Noorderlaan to Schelde Crossing
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
Near Schelde Crossing - 4th Option
ARUP
A12 Interchange
General Arrangement & Profile
Schelde Crossing to Noorderlaan E/B
For Information
HWY-ABD-A-419-d

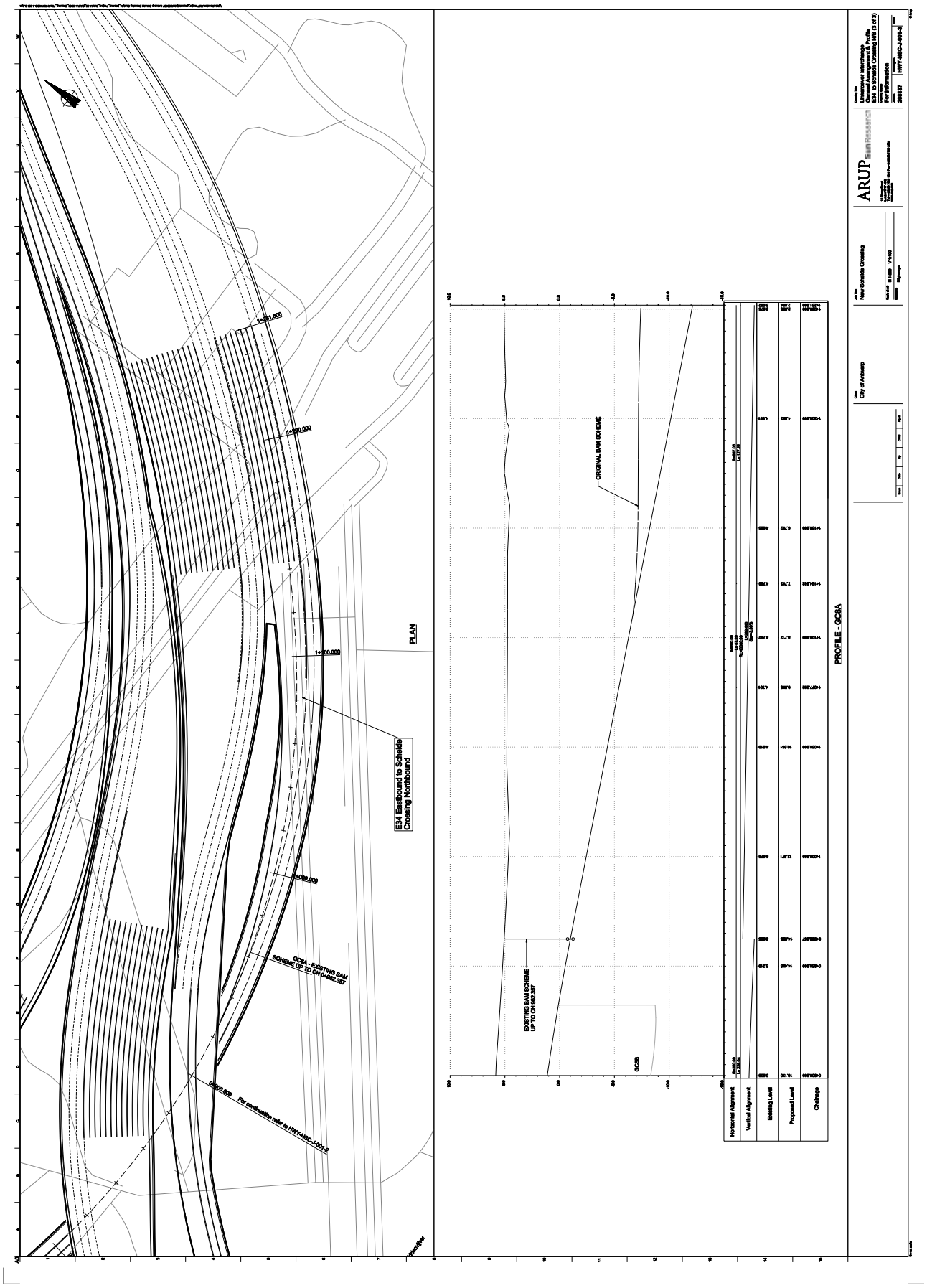

Schelde Crossing to R1
0+000.000
0+050.000
0+100.000
0+150.000
0+200.000
0+250.000
0+300.000
0+350.000
0+400.000
0+450.000
+500.000
Straight
R= -1000.00
R= 739.13
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
R=1000.00
Lc 352.90
L=316.634
Slp=2.40%
R=739.13
Lc 102.03
LVC65.03
L232.52
L132.52
R13974.91
LVC24.41
L212.20
L112.20
R10000.00
City of Antwerp
New Schelde Crossing - 4th Option
H 1:500 V 1:100
Highways
ARUP
A12 Interchange
General Arrangement & Profile
Scheldе Crossing to R1 (Sheet 1 of 3)
For Information
208137
HWY-NSC-J-117-1
Do not scale

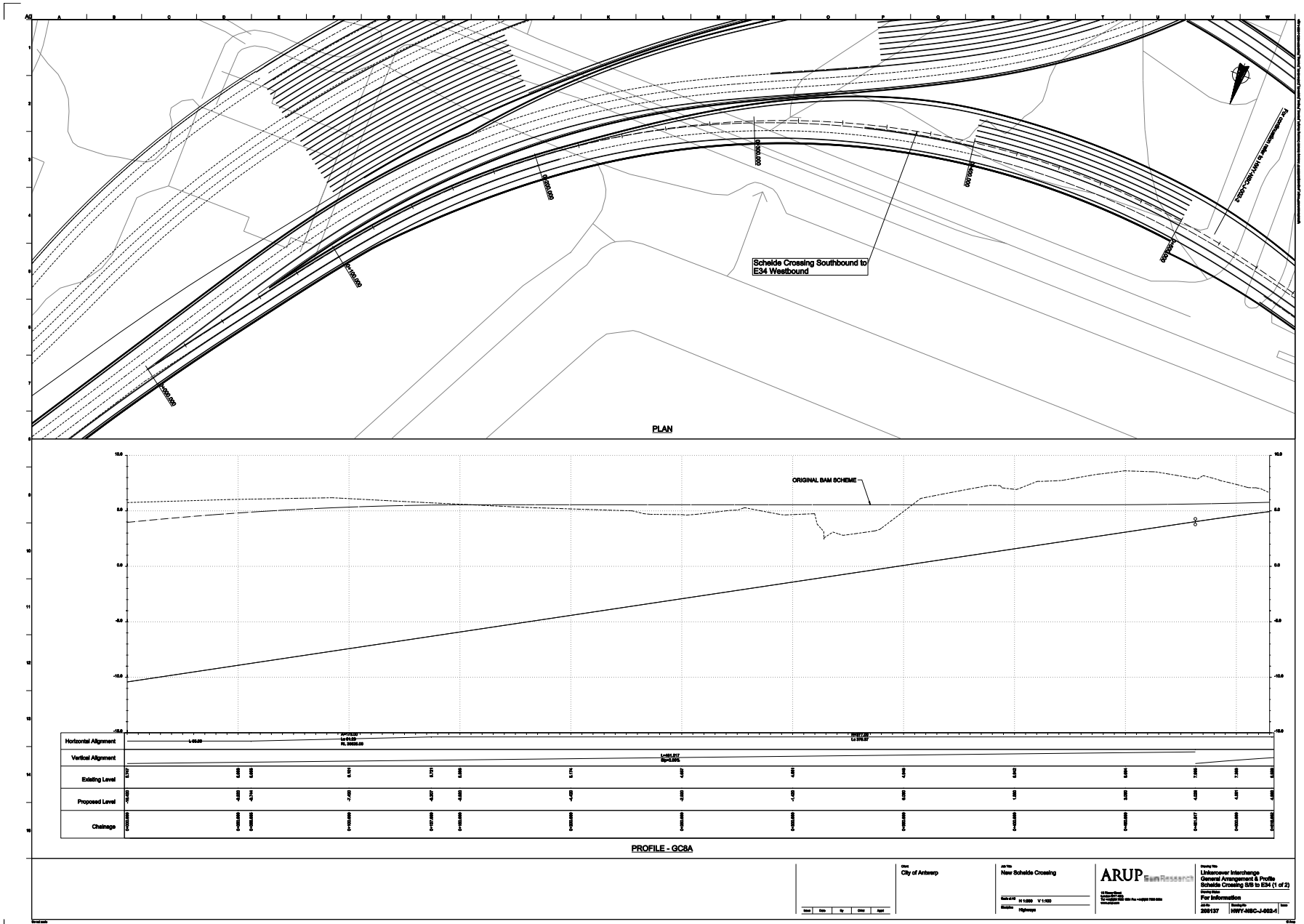

Schelde Crossing to R1
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
A12 Interchange
Near Schelde Crossing - 4th Option
City of Antwerp
ARUP

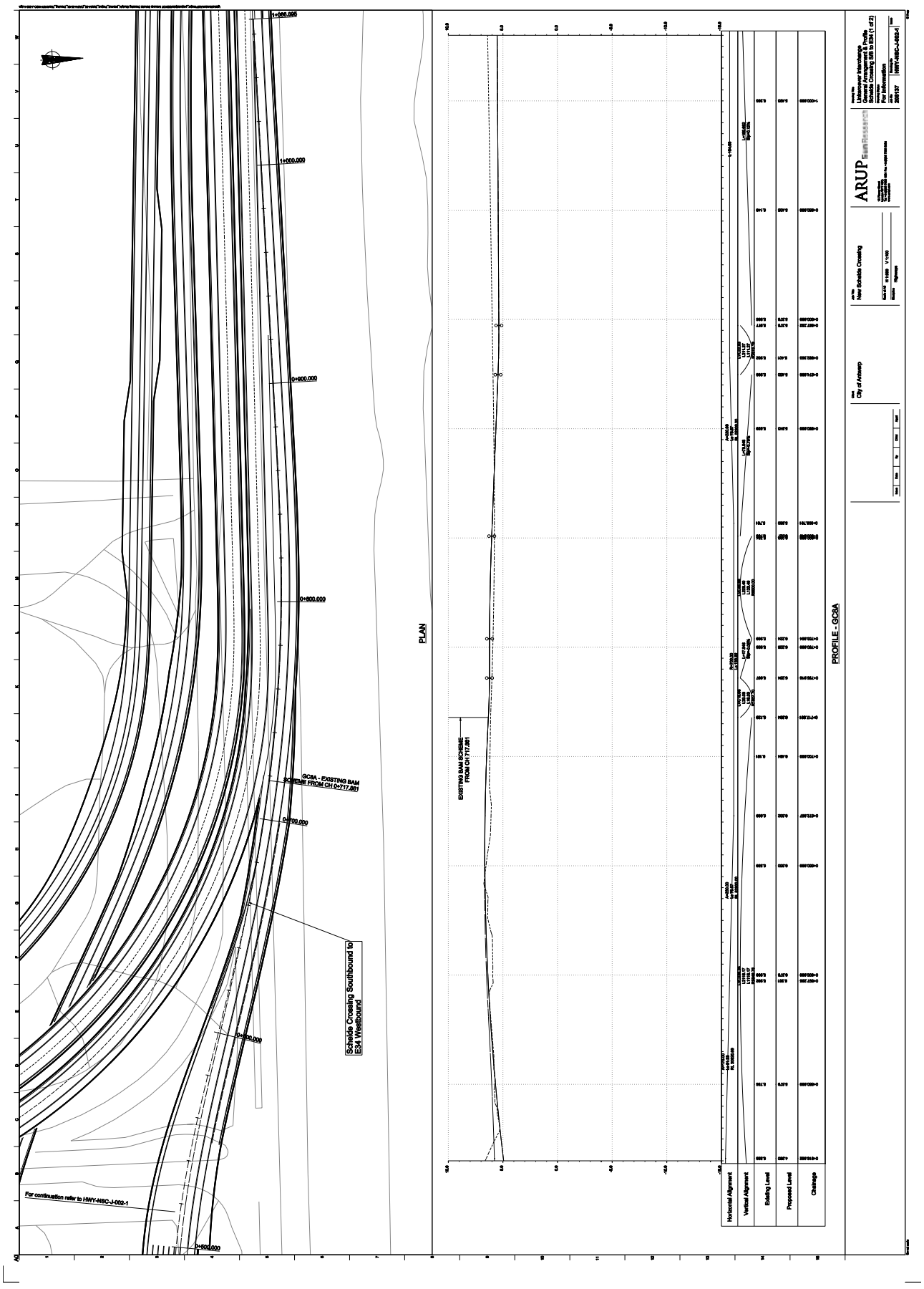

1+300.840
1+300.000
1+280.000
1+200.000
1+160.000
1+140.000
1+120.000
1+100.000
1+080.000
1+060.000
1+040.000
Schelde Crossing to R1
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
A12 Interchange
Scheldt Crossing to R1 (Phase 3 of 3)
For Information
City of Antwerp
Near Schelde Crossing - 4th Option
ARUP

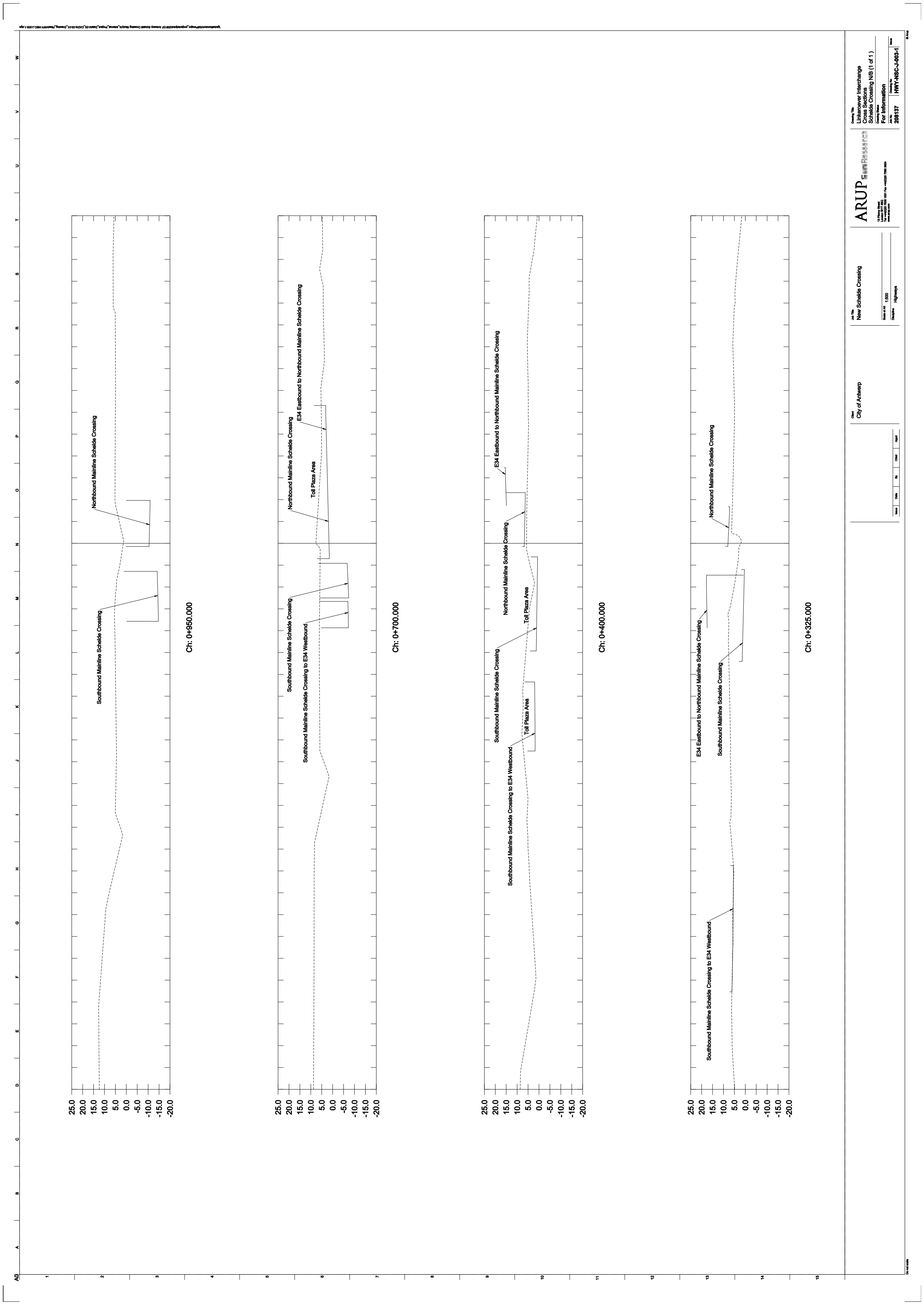

E34 Eastbound to Schelde Crossing Northbound
PLAN
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
PROFILE - GC8A
City of Antwerp
New Schelde Crossing
ARUP
Linkenover Interchange
General Arrangement & Profile
E34 to Schelde Crossing NB (1 of 3)
For Information
209137
HWY-NBC-J-001-0


GC8A - EXISTING BAM SCHEME UP TO CH 0+962.357
For continuation refer to HWY-NSC-J-001-3
E34 Eastbound to Schelde Crossing Northbound
For continuation refer to HWY-NSC-J-001-1
Het Vliet
PROFILE - GC8A
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
City of Antwerp
New Schelde Crossing
ARUP
For Information

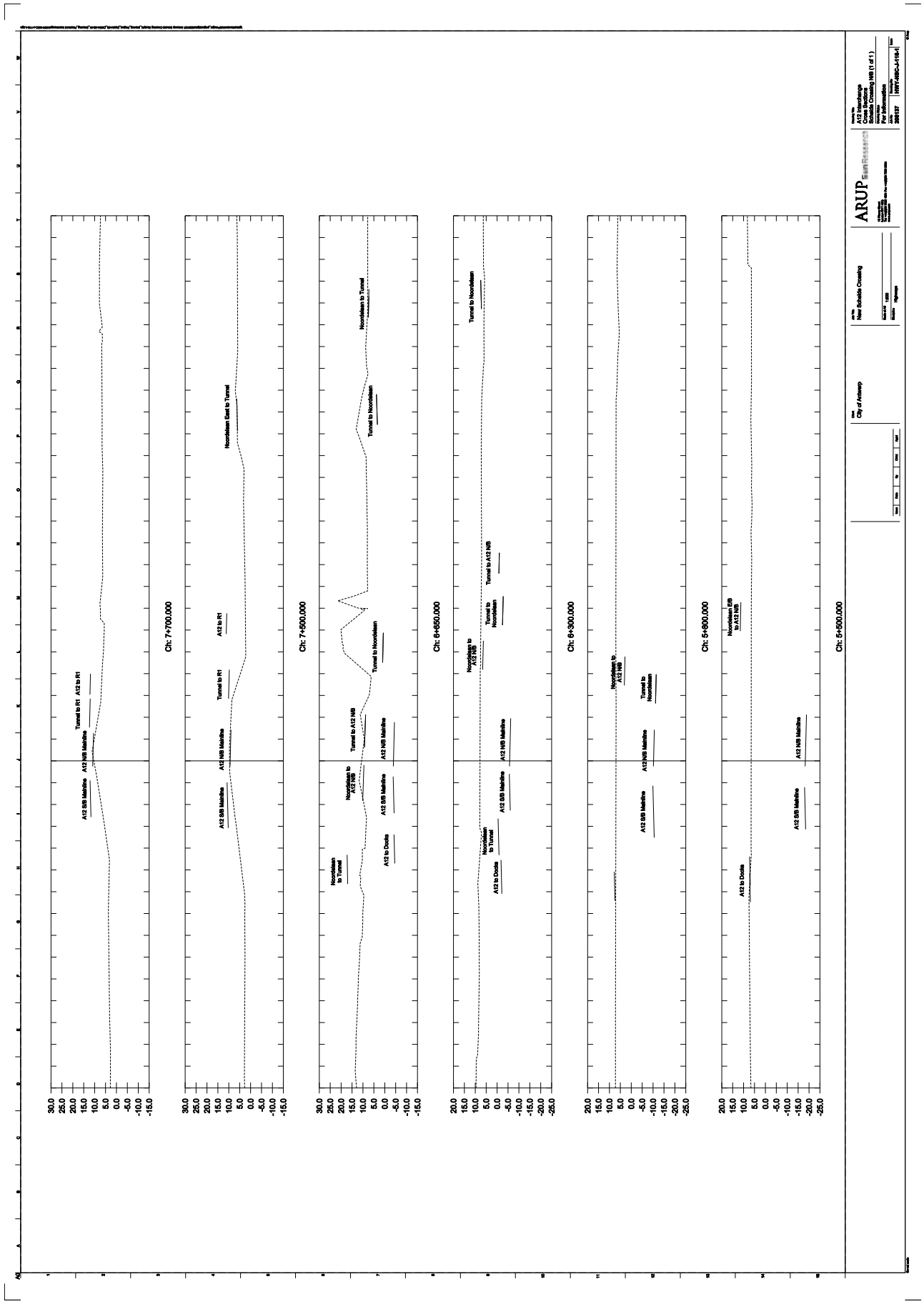

PLAN
E34 Eastbound to Schelde Crossing Northbound
GC8A - EXISTING BAM SCHEME UP TO CH 0+850.357
For continuation refer to HWY-ASC-A001-2
PROFILE - GC8A
ORIGINAL BAM SCHEME
EXISTING BAM SCHEME UP TO CH 850.357
GC8B
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
Liefkenshoek Interchange
Near Schelde Crossing
City of Antwerp
ARUP

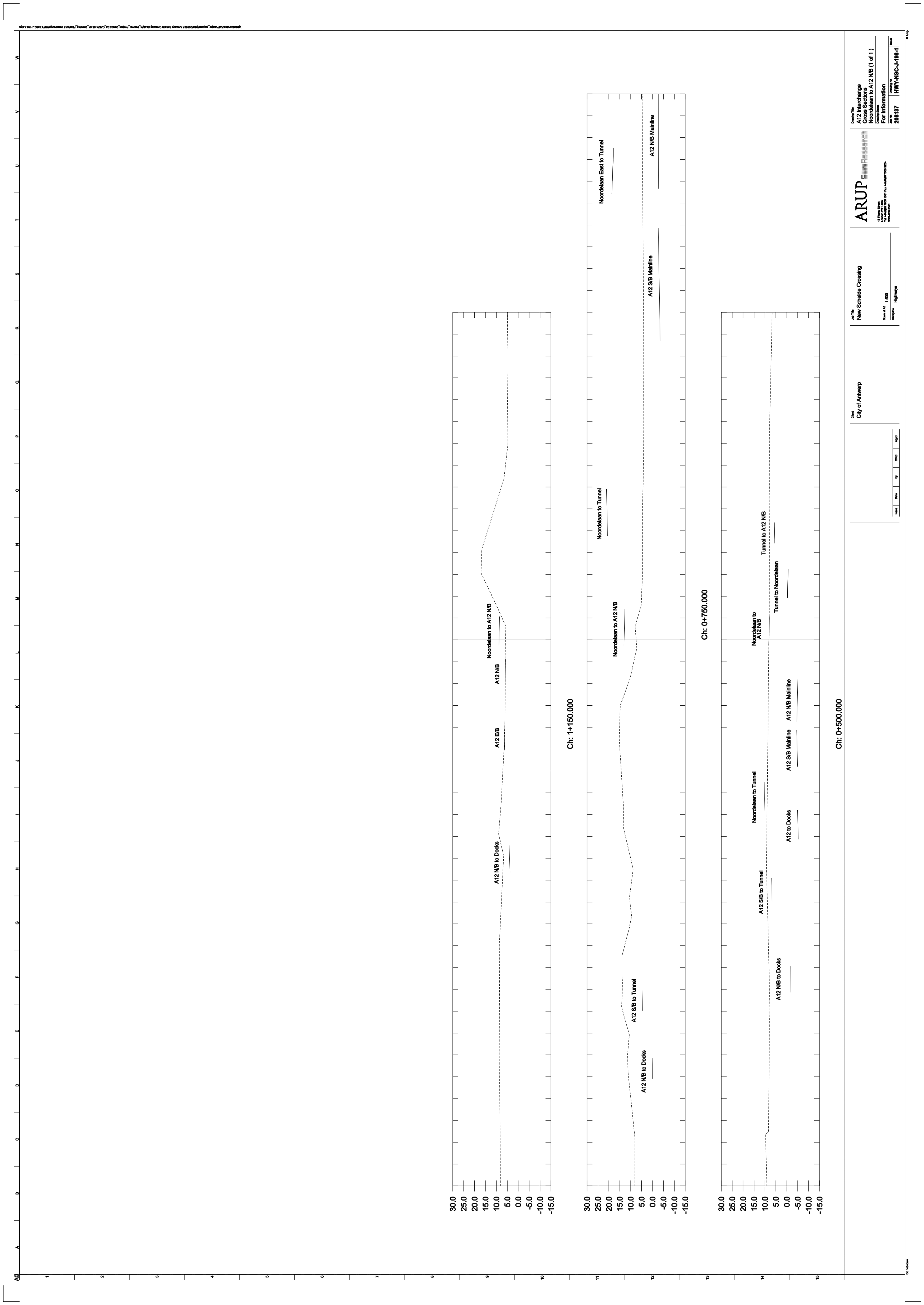

Schelde Crossing Southbound to E34 Westbound
PLAN
ORIGINAL BAM SCHEME
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
PROFILE - GC8A
City of Antwerp
New Schelde Crossing
ARUP
Linkeroever Interchange
General Arrangement & Profile
Schelde Crossing S/S to E34 (1 of 2)
For Information
265137
HWY-NBC-J-002-4

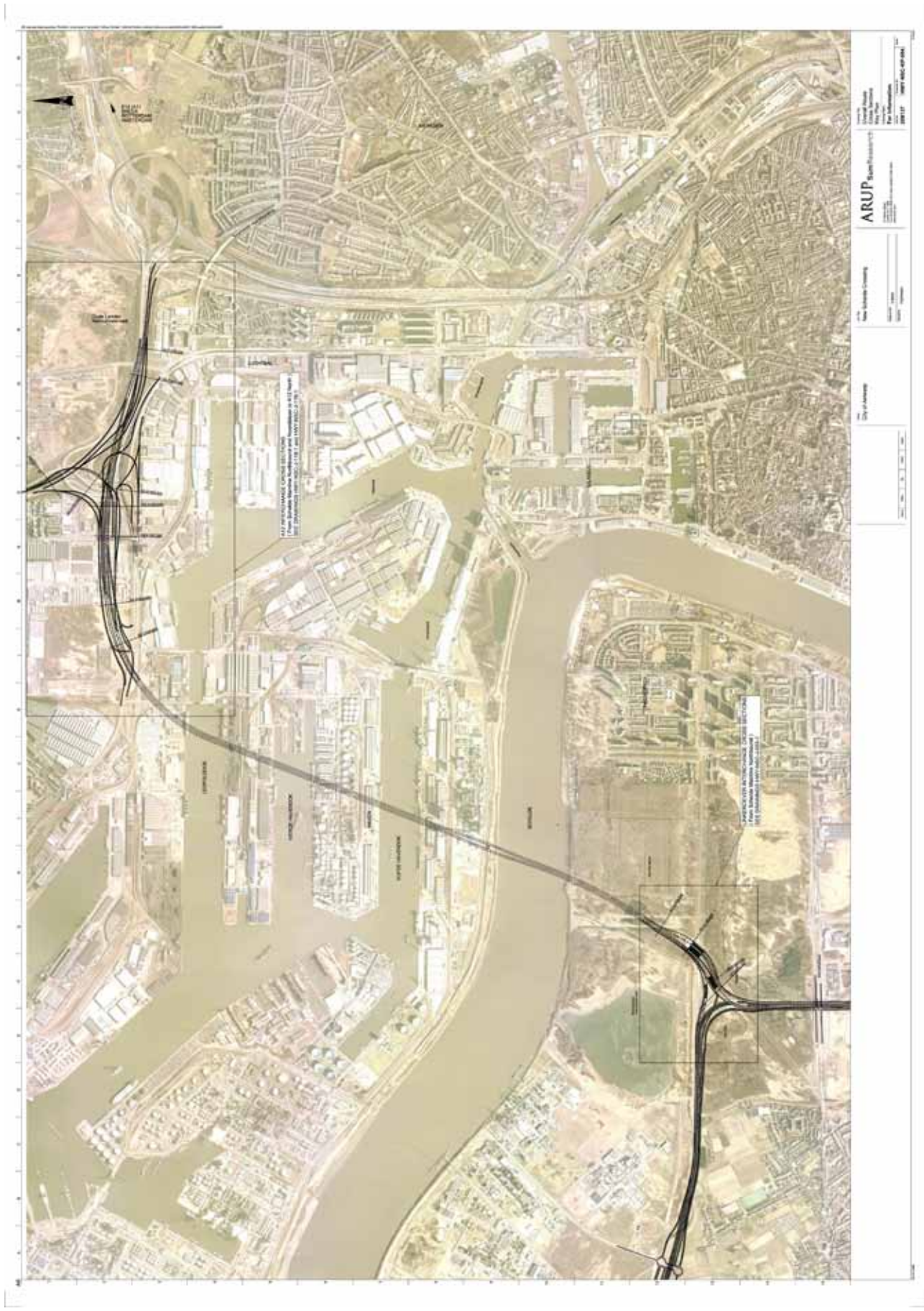

PLAN
PROFILE - GC8A
1+066.895
1+000.000
0+900.000
0+800.000
0+700.000
0+600.000
0+500.000
GC8A - EXISTING BAM SCHEME FROM CH 0+717.881
Schelde Crossing Southbound to E34 Westbound
For continuation refer to HWY-NBC-I-002-1
EXISTING BAM SCHEME FROM CH 717.881
Horizontal Alignment
Vertical Alignment
Existing Level
Proposed Level
Chainage
Linkeroever Interchange
General Arrangement & Profile
Schelde Crossing (GC8 to GC8A) (1 of 2)
For Information
HWY-NBC-I-003-4
Noe Schelde Crossing
City of Antwerp
ARUP



Ch: 0+950.000
Northbound Mainline Schelde Crossing
Southbound Mainline Schelde Crossing
Ch: 0+700.000
E34 Eastbound to Northbound Mainline Schelde Crossing
Toll Plaza Area
Southbound Mainline Schelde Crossing to E34 Westbound
Ch: 0+400.000
Ch: 0+325.000
City of Antwerp
New Schelde Crossing
For Information
ARUP


Client
City of Antwerp
Near Schelde Crossing
ARUP
A12 Interchange
Cross Sections
Schelde Crossing to N70 (1 of 1)
For Information
Ch: 7+700.000
Ch: 7+600.000
Ch: 6+850.000
Ch: 6+300.000
Ch: 5+800.000
Ch: 5+500.000
Noordelaan East to Tunnel
Tunnel to Noordelaan
Tunnel to A12 NB
Noordelaan to A12 NB
A12 to Docks
A12 SB Mainline
A12 NB Mainline
Tunnel to R1
A12 to R1
Noordelaan E/B to A12 NB


Ch: 1+150.000
Ch: 0+750.000
Ch: 0+500.000
A12 N/B to Docks
A12 E/B
A12 N/B
Noordelaan to A12 N/B
A12 S/B to Tunnel
Noordelaan East to Tunnel
Noordelaan to Tunnel
A12 S/B Mainline
A12 N/B Mainline
Tunnel to A12 N/B
Tunnel to Noordelaan
City of Antwerp
New Schelde Crossing
ARUP
For Information



A3
MOBILITY METHODOLOGY

1.1 INTRODUCTION

This appendix of the report describes the methodology used to undertake the mobility and safety appraisal for the schemes. To assess the schemes a set of Mobility indicators were used, as follows

- Journey Time Savings;
- Incident Analysis;
- Accessibility Analysis;
- Rat-Running Traffic; and
- Traffic Safety

The appraisal compares each scheme (Do-Something) with a single reference situation (Do-Minimum).

The following sections of this appendix describe the following:

- the transport model used to provide the appraisal inputs;
- scheme options tested;
- tolling assumptions; and
- appraisal methodology for assessing the indicators.

1.2 MMA TRANSPORT MODEL

Introduction

All traffic forecasts for this study were prepared using the MMA multi-modal transport model which has been developed and maintained by the Flemish Traffic Centre (FTC). All model runs were specified by Arup SUM having been agreed with the Steering Group. FTC carried out all model runs. They also prepared skim matrices (e.g. the extraction of zone-to-zone travel times for economic and accessibility analysis) and traffic assignment statistics.

Model Version

The current version of MMA is version 3.5. Version 3.4 of the model is fully described in the "Modelopbouw MMv3.4, Gedetailleerde Beschrijving Modelprocessen" report dated February 2008.

Model Software

MMA is run using the CUBE VOYAGER software which is an internationally recognised transport modelling software suite.

Model Coverage

The model covers the entire Flanders Region and it wider commuting catchment area and has over 3,350 zones. There are approximately 1,500 zones within the Antwerp, Mechelen and St Niklaas Arrondissements.

Transport Modes

The model represents travel by the following modes:

- car driver
- car passenger
- public transport

- walk
- cycle.

The model also has the capability to forecast park and ride trips where a car is used to access a public transport mode.

Time Periods

For the purposes of assignment, where travellers choose their routes through the transport network, the model has representation of the following peak periods on a working day:

- AM Peak Hour (08:00-09:00); and
- PM Peak Hour (17:00-1800).

Model Years

The 3.4 version of the model was developed using information from the 2001 National Census. A 2007 Present Year validation has been carried out by FTC. The network and zonal data for 2007 were extensively checked and the integration with the freight model was fully established. The 3.5 version of the model starts with this enhanced 2007 workout as the new base year.

Trip Purposes

The model MMA segments travel demand into the following trip purposes:

- commuting
- education (school)
- shopping
- recreation
- other.

Trip Matrices

Travel for two trip purposes - commuting and education –was captured in the 2001 Census. Therefore, observed trip matrices are readily available. Future years including 2007, were generated using both growth and synthetic models.

Demand matrices for other trip purposes were generated using synthetic models.

Model Functionality

MMA includes the following behavioural sub-models:

- car ownership/availability
- trip generation
- trip distribution
- mode choice
- assignment (road traffic and public transport).

The car ownership and trip generation models are used to calculate growth in travel demand by household type.

The distribution model estimates the influence of changes in travel time and cost on people's choice of trip destinations. The mode choice model estimates the proportion of travellers selecting each mode between the trip origin and destination zones. The distribution and mode choice sub-models take into account the disutility of each mode expressed as a generalized cost. For passenger car trips the main elements of

generalized cost will be travel time, vehicle operating costs (e.g. fuel costs), parking costs and tolls. For public transport trips the main elements of generalized cost include walk time, waiting time, in-vehicle time plus fares.

Assignment User Classes

For road traffic assignments there are three user classes:
- passenger cars;
- light goods vehicles; and
- heavy goods vehicles.

Passenger car units (pcu) are used to represent the relative impacts of each vehicle type of traffic speeds and congestion. The factors are 1 for cars, 1.5 for light goods vehicles and 2.0 for heavy goods vehicles.

Representation of Congestion

The model is able to reflect two aspects of congestion:
- reductions in speeds on road links as traffic flows approach link capacity; and
- delays at junctions (e.g. traffic signals) caused by traffic exceeding capacity.

Speeds on links are represented using conventional speed-flow curves.

Junction capacities and delay calculations are based on the principles set out in the Highway Capacity Manual (HCM). It should be recognized that the level of junction modelling in the MMA model is satisfactory for a strategic model, but relatively coarse when considered in the local context.

Freight Trip Matrices

The trip matrices for goods vehicles come from a separate Freight Transport Model for the Flanders Region which includes representation of goods movement by road, rail and water. Port employment related trips come from the Plan MER study forecasts of port traffic growth. The growth forecasts are based on the Plan 1B forecast variant.

Forecast Years

In the current version of MMA transport forecasts are prepared for 2015 and 2020.

1.3 SCHEME OPTIONS

The schemes assessed for this mobility appraisal are shown in Table 8.1. The Flemish Traffic Centre carried out a run of the MMA transport model for each of the options. The Do-Minimum model run represents the current road network in the Antwerp region and the schemes in the Antwerp Mobility Masterplan which are expected to be in place in 2020 including the Urban Ring Road and Singel improvements and public transport (tram) enhancements and Temse Bridge increased capacity. The Do-Something schemes for appraisal were as follows;
- Arup/Sum Route scenarios with and without a junction at Oosterweel
- Refinement of the Arup/Sum Route scenario

The Arup/Sum Route without a junction at Oosterweel represents the Conforming Scheme with respect to the Pre-Conditions, namely:

- the Kennedy Tunnel is not accessible to trucks,
- the Kennedy Tunnel is toll-free for cars; and
- the new Schelde Crossing has a capacity of 2 x 3 lanes

A number of other model runs were undertaken using the MMA transport model as part of the development of Refined Arup/SUM Scheme for the mobility appraisal and considered different tolling assumptions by vehicle type and by Schelde crossing.

The key assumptions for the Refined Arup/SUM Scheme were as follows:
- Kennedy Tunnel open to trucks
- Goods vehicles tolled in the Liefkenshoek Tunnel, Oosterweel connection and the Kennedy Tunnel
- Cars tolled in the Liefkenshoek Tunnel, Oosterweel Connection and Kennedy Tunnel (charge of 50 cents, 2001 prices)

Specification of Scheme Options Appraised

Table 6.1 : Conforming Scheme with Pre-Conditions of the Flemish Government with an Oosterweel Junction

Scheme Element	Lanes/Comment	Car Toll	Truck Toll	Truck Ban
Tunnels				
Oosterweel tunnel	2*3	FGD	FGD	
R2 Liefkenshoek	2*2	FGD	FGD	
R1 Kennedy	2*3			●
N49 Waasland	2*1 (PM wbd only)			●
R2 Franz Tijsmans	2*2			
R2 Beveren Tunnel	2*2			
Bridges				
Temse	2*2			
Other Road Improvements				
R1 Ring Road	2*4+			
Urban Ring Road	2*2			
R10 Singel	2*1			
E34 west (Waasland)	Exclude			
E17 west (Waasland)	Exclude			
R4/E34 Link, Ghent	Exclude			
Oosterweel Junction	Include			
Traffic managment				
ATM (reduce speed limit on R1)	Exclude			
Diversionary Signing (international)	Exclude			

Table 6.1: Continued: Conforming Scheme with Pre-Conditions of the Flemish Government without an Oosterweel Junction

Scheme Element	Lanes/Comment	Car Toll	Truck Toll	Truck Ban
Tunnels				
Oosterweel tunnel	2*3	FGD	FGD	
R2 Liefkenshoek	2*2	FGD	FGD	
R1 Kennedy	2*3			●
N49 Waasland	2*1 (PM wbd only)			●
R2 Franz Tijsmans	2*2			
R2 Beveren Tunnel	2*2			
Bridges				
Temse	2*2			
Other Road Improvements				
R1 Ring Road	2*4+			
Urban Ring Road	2*2			
R10 Singel	2*1			
E34 west (Waasland)	Exclude			
E17 west (Waasland)	Exclude			
R4/E34 Link, Ghent	Exclude			
Oosterweel Junction	Exclude			
Traffic managment				
ATM (reduce speed limit on R1)	Exclude			
Diversionary Signing (international)	Exclude			

Table 6.1: Continued: Refined Arup/SUM Scheme Without an Oosterweel Junction

Scheme Element	Lanes/Comment	Car Toll	Truck Toll	Truck Ban
Tunnels				
Oosterweel tunnel	2*3	●	FGD	
R2 Liefkenshoek	2*3	●	FGD	
R1 Kennedy	2*3	●(50 cents)	FGD	
N49 Waasland	2*1 (PM wbd only)			●
R2 Franz Tijsmans	2*2			
R2 Beveren Tunnel	2*2			
Bridges				
Temse	2*2			
Other Road Improvements				
R1 Ring Road	2*4+			
Urban Ring Road	2*2			
R10 Singel	2*1			
E34 west (Waasland)	Exclude			
E17 west (Waasland)	Exclude			
R4/E34 Link, Ghent	Exclude			
Oosterweel Junction	Exclude			
Traffic managment				
ATM (reduce speed limit on R1)	Exclude			
Diversionary Signing (international)	Exclude			

1.4 TOLLING ASSUMPTIONS FOR TRAFFIC FORECASTS

The existing tolls for vehicles using the Liefkenshoek Tunnel are shown in Table 8.2. These toll levels are in 2007 prices.

Table 6.2: Existing Tolls on the Liefkenshoek Tunnel

Vehicle Type	Toll (Euros) Excluding VAT		
	Manual	TeleToll	Credit Card
Cars (<2.5m in height)	5,00	3,15	4,50
Trucks (>2.5m in height)	17,00	12,55	14,50

Source: Flemish Traffic Centre

The MMA 2007 base year model uses tolls which represent a weighted average of the tolls paid using payment methods shown in Table 8.3. During the calibration of the 2007 base year model, an adjustment was made to the weighted toll values used in the MMA model to improve the representation of traffic on the competing road crossings of the Scheldt. These 2007 toll levels on Liefkenshoek were also applied in the Do-Minimum transport model runs.

Table 6.3: MMA Model 2007 Base Year Tolls on Liefkenshoek Tunnel

Vehicle Type	Toll (Euros) Excluding VAT	
	Modelled Toll	
Cars	2,60	Assumed that drivers perceive VAT
LGVs	9,10	VAT excluded
HGVs	10,20	VAT excluded

Source: Flemish Traffic Centre

The scheme tolling assumptions are shown in Table 8.4. These tolls are in 2002 prices and to ensure consistency the same toll values were applied to the Liefkenshoek Tunnel, Oosterweel Crossing and the Kennedy Tunnel. These toll levels, defined by the Flemish Government, take into account different methods of payment and are appropriately weighted averages. In the MMA model car drivers are assumed to perceive, whilst LGV and HGV drivers are assumed not to perceive VAT. The rate of VAT assumed was 21%.

Table 6.4: MMA Model Scheme Option Tolls

Vehicle Type	Modelled Tolls (euros, 2002 prices)	
	2007 Base Year	Do-Something Options
Cars	2,60	2,42
LGVs	9,10	13,00
HGVs	10,20	15,60

1.5 APPRAISAL METHODOLOGY

1.6 APPRAISAL PARAMETERS

The key parameters used in the mobility appraisal, are as follows:

- Units of account – resource costs are used as the unit of account;
- Appraisal period – the mobility indicators are presented for a single year appraisal, 2020;
- Discount rate – a discount rate of 4% has been used (the same rate as used by BAM for cost benefit analysis of the Masterplan);
- Value of Time (VOT) – separate Values of Time were applied for car/vans and trucks (see below);
- Growth in GDP - assumed to be 1.9% per annum to 2020; and
- 2007 prices - calculated using the Belgian Consumer Price Index

1.7 VALUE OF TIME

The Values of Time (VOTs) used to produce the monetised benefits are presented in Table 8.5. Separate VOTs were applied for cars/vans and trucks respectively. The VOTs are assumed to increase in line with Gross Domestic Product (GDP) per capita.

Table 6.5: Value of Time Assumptions[1]

Vehicle Class	€ (2001 prices)
Cars/vans	7.20
Trucks	38.42

1.8 ANNUALISATION FACTORS

To estimate total annual values from the MMA model outputs for the journey time benefits, the factors shown in Table 8.6 were applied. These factors are the same as those used by BAM to ensure consistency of appraisal. The factors were applied to the MMA transport model outputs for the two peak hours.

Table 8.6: Annualisation Factors for Journey Time Benefits1

Period	Factor
Morning AM peak hour to AM Peak Period	2,5
Morning PM peak hour to PM Peak Period	2,5
Average Weekday to 7-Day Week	5,0
Average Week to Year	50,0

[1] From 'Masterplan Antwerp – Societal Cost-Benefit analysis of the Road and Public Transport Projects', BAM, November 2004

The annualisation factors used to convert MMA modelled peak hour vehicle kilometres to annual vehicle kilometres are shown in Table 8.7. These annualisation factors were based on 2008 traffic count totals for the Schelde River screenline provided by the Flemish Traffic Centre.

Table 8.7: Annualisation Factors for the Accident Savings Benefits

Vehicle	AM Peak Hour	PM Peak Hour	Average of AM and PM Peak Hours
Cars/Vans	2.244	2.232	2.029
LGVs	2.901	2.830	2.866
HGVs	2.390	3.034	2.712

Source: Arup based on data provided by Flemish Traffic Centre

1.9 JOURNEY TIME SAVINGS

This indicator measures the impact of each scheme in terms of the change in total modelled vehicle-hours (separating free-flow and delay time) travelled on the road network. The vehicle hours are monetised in accordance with social/cost benefit analysis practice using the Value of Time for cars/vans and trucks shown in Table 8.5.

$$JourneyTimeBenefits = \frac{1}{2}\sum_{ij}\left(Trips_{DoMin} + Trips_{DoSomething}\right)\cdot\left(Cost_{DoMin} - Cost_{DoSomething}\right)$$

The vehicle hours used in the calculation of the change in generalised journey time (GJT) were output from the MMA model for each of the scheme options. As the Oosterweel Crossing will result in change in total demand for private transport from the improved cross-river network connectivity, the journey time benefits were calculated for origin-destination matrices by vehicle type using the rule of half calculation of road user benefits appropriate for a variable trip matrix situation. The MMA model was used to calculate the road user benefits using the following formula:

The journey time benefits were annualised and monetised using the Values of Time in Table 8.5. For each option the Present Value of Benefits (PVB) in 2020 were used to compare the relative performance of each option.

1.10 INCIDENT ANALYSIS

The Brief requires that an assessment is carried out to compare how each option performs in the event of a major incident in the Schelde tunnels which blocked the Antwerp road system. Two major (reference) incidents were tested for each scheme option, as follows:

- Incidents Test 1: two westbound lanes in the Kennedy Tunnel are blocked for one hour during the PM peak period; and
- Incidents Test 2: two westbound lanes in the Oosterweel crossing are blocked for one hour during the PM peak period.

A Do-Minimum incident test was also carried out on the same basis (with two westbound lanes in the Kennedy Tunnel blocked for one hour during the PM peak period).

The MMA transport model was run to quantify the excess vehicle hours by vehicle type incurred as a result of a major event when compared with a 'normal' PM peak hour situation. This change in vehicle hours was monetised using the Values of Time described in Table 8.2. The results were compared with the Do Minimum situation to quantify the extra travel time generated purely by the incident

1.11 ACCESSIBILITY ANALYSIS

An accessibility analysis was carried out to assess the degree to which each scheme option improved the accessibility (travel time) to a number of key employment destinations in Antwerp city centre and the port and associated industrial facilities.

The relative accessibility to these destinations in each option was calculated from the MMA transport model to provide AM peak period inter-zonal travel times between all origin zones and each of the selected destination zones in the city centre and the port. Using the forecast population in each origin zone, the amount of population located within car journey time bands of the specified destination zone was calculated. The zones used for the accessibility analysis are shown in Figure M35.

Figure M35: Location of Accessibility Analysis Model Zones

1.12 RAT-RUNNING TRAFFIC

In order to estimate traffic displacement, the MMA transport model outputs were used to quantify the vehicle kilometres travelled by vehicle type and road type for each option. The model outputs differentiate between vehicle kilometres travelled on motorway, principal roads, secondary roads and tertiary roads (where they are included in the model). Therefore, an increase in rat-running is indicated by higher flows on secondary and tertiary roads. This analysis indicates which parts of the city gain and lose rat-running traffic under each option.

1.13 TRAFFIC SAFETY

To assess traffic safety, a quantitative assessment was carried out for each scheme option of accident savings benefits. These benefits were calculated using personal injury accident (PIA) rates per million vehicle kilometres. Where a scheme is expected to remove traffic from roads with high accident rates and introduce roads with improved design standards it is expected that accident rates and costs will fall. However, the accident rates used for such an analysis are usually based on national statistics and may not reflect the local characteristics of a scheme. In the case of

the Antwerp Ring Road (R1), this road experiences high accident rates as a result of weaving traffic. This is exacerbated by high traffic flows, short weaving distance between junctions on the R1 and the high percentage of truck traffic.

To calculate the accident benefits for each option, accident rates by road type were required. For consistency, we have used the same accident rates as reported by BAM in the 'Masterplan Antwerp- Societal Cost-Benefit Analysis of the Road and Public Transport Projects'. Table 8.7 contains the total accident rates by type of accident per million vehicle kilometres by road type used in the BAM cost benefit analysis. The total accident risk is assumed constant and will continue until 2020. In addition, new roads are assumed to be built to stricter safety standards, and therefore are likely to have a lower accident rate. The application of accident rates was based on using these rates to obtain the total number of forecast accidents per billion vehicle kilometres by road type. Then the ratio of slight, serious and fatal accidents set out in Table 8 of the BAM report were applied to obtain the total forecast accidents by PIA type.

Table 8.7: Accident Rates by Type of Accident and Road Type (Per billion vehicle kilometres)

		Main Roads	**N Roads**	**Local Roads**
Existing Roads	Total accidents	155,4	644,9	1.198,1
New Roads	Total accidents	75,0	145,0	250,0

Source: Societal Cost-Benefit analysis of the Road and Public Transport Projects', Table 11, BAM, November 2004

Valuations of accident costs were obtained from the cost-benefit analysis carried out for the Antwerp Masterplan and are reproduced in Table 8.8. These costs are based on the 2003 European Study by ICF Consulting.

Table 8.8: Values of Accident Costs Used in the Accident Appraisal

Accident Severity	**Costs in 2004 Prices (Euro)**							
	Lost Output	**Human Costs**	**Medical Costs**	**Tangible Costs**	**Admin Costs**	**Emergency Costs**	**Time (?)**	**Total**
Fatal Accident	71.3166	121.1933	9.601	13.314	374	2.382	17.877	196.8648
Serious Accident	31.909	163.980	19.130	6.330	234	327	5.959	227.867
Slight Accident	3.667	13.630	1.565	3.714	141	70	5.959	28.745

Source: Societal Cost-Benefit analysis of the Road and Public Transport Projects', BAM, November 2004

From the MMA model output of vehicle kilometres by road type under each option test, annual flows for each forecast year were estimated using annualisation factors. In order to apply the BAM accident rates, modelled vehicle kilometre figures were output by up to 18 categories, disaggregated by:

Three vehicle classes;
- Car
- HGV
- LGV

Three road types;
- Main Roads
- N-roads
- Local roads

Two road classes;

- existing roads
- new roads.

Then the accident rates per million vehicle kilometres by road type were applied to estimate how many personal injury accidents at each level of severity there would be a year by road type with each of the options. This analysis highlighted any of the options which have particular benefits through retaining traffic on high standard roads which tend to have relatively low accident rates.
The accident benefits of each scheme (with the respect to the Do-Minimum Scenario) were calculated for 2020 using the accident cost data in Table 8.8.

A7

HAZARD IDENTIFICATION RISK ASSESSMENT

Deze bijlage is, in het nederlands, ook terug te vinden in het boek. Zie pagina 111 hoofdstuk 3.2.2.1 identificatie van gevaren; risico-evaluatie; beperkende maatregelen

4. HAZARD IDENTIFICATION; RISK ASSESSMENT; MITIGATION

The first part of this appendix considers the Schelde crossing tunnel in relation to other tunnels in Antwerp and around the world. The second part considers the similarities and differences of open roads, bridges and tunnels, and the third part t the more detailed hazard identification, risk assessment and mitigation for the Fourth Option for the Schelde crossing.

Comparison with other tunnels

In Antwerp region

In comparison, the Westerschelde Tunnel in the Netherlands, which also crosses the River Schelde, is 6.6km long and consists of two carriageways in either direction.

There are also several tunnels crossing the River Schelde within the Antwerp city limits, these include the Kennedy Tunnel, Leifkenshoek Tunnel and Frans Tijmans Tunnel. The Lode Craeybeckx Tunnel on the E19, South of Antwerp City is a 1.6km long cut and cover tunnel with four lanes of traffic in each direction. The Bevrijdings Tunnel on the A12, is a cut and cover tunnel linking the Kennedy Tunnel to the South. There are also many other short cut and cover junctions in the city and the old bi-directional Waaslaan tunnel.

Tunnels are common in the Antwerp region and drivers are consequently familiar with the experience of driving in them.

Tunnels World-wide

The 4th option tunnel in Antwerp at 4.3km is very much shorter than the world's longest road tunnel: the Lærdal Tunnel in western Norway at 24.5km long.

Large diameter TBM tunnels for roads are also becoming more common. The Madrid M30 ring road project employed two 15.1m diameter Earth Pressure Balance Tunnel Boring Machines to bore 3.65km of 3-lanes road tunnels, which is very similar to the 4th option tunnel crossing in Antwerp. Similar diameter tunnels are in construction in China.

These observations show that the concepts and technology are within the range of modern custom and practice within the industry.

Comparison of tunnel and bridge with open road

Open Road

Drivers in the Antwerp region are exposed to different types of open roads, ranging from country lanes in a flat and open landscape with limited usage, through to multi lane trans-European motorways with heavy traffic flows and a high usage by Heavy Goods Vehicles (HGV's). The motorways in the Antwerp region have numerous junctions therefore, joining and exiting at junctions and traffic weaving is a normal part of the driving experience. Due to the busy nature of the roads, the motorways are installed with Intelligent Transport Systems (ITS) to inform drivers of road information.

Traffic on an open road is exposed to different weather conditions therefore they benefit from natural lighting during daytime and good weather providing drivers with good visibility, yet they suffer from being exposed to heavy rainfall and, unless street lighting is provided, are reliant on headlights at night which provide limited visibility. An open road provides an unblocked sightline for drivers and generally there will be no limitation on the distance a driver can see ahead, except for sections with a sharp bend, a rapid change in gradient, bad weather or at night.

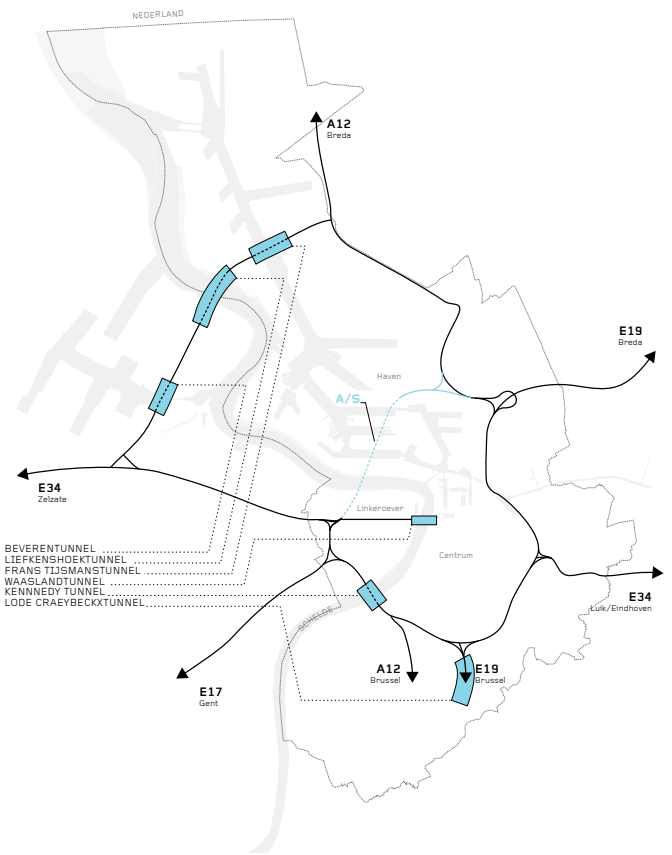
Accessibility on open local road is generally greater. In the event of an incident open roads allow intervention of emergency services and evacuation of drivers from the road in all directions. Accessibility on motorways is more restricted and can be similar in access terms as a tunnel or a bridge; this is because access to motorways is via junctions and the emergency vehicles would have to gain access either via the unaffected carriageway or along the hard shoulder.

Tunnel

A tunnel refers to an underground road and is a confined passage (completely enclosed on all sides).

There are numerous tunnels in the Antwerp region, including the:

- Kennedy, Tunnel (two bored road tunnels, both 14.25m wide with x3 lanes of traffic in each direction),
- The Leifkenshoek (an immersed tube tunnel 1.3km long, 31.25m wide by 9.6m high forming 2 lanes of motorway in each direction), Frans Tijmanns, Durnar.
- Craeybeckx cut-and-cover
- The Waasland (a 1.8km long, bidirectional tunnel).



In addition, there is the Westerschelde Tunnel to the north west of Antwerp in the Netherlands, a 6.6km long 2 lane motorway road tunnel.

The majority of tunnels in the Antwerp Region are either on main roads or motorways therefore the majority of the potential users of the 4th Option tunnel will be experienced and familiar with driving in tunnels. The 4th Option tunnel is proposed to be fitted with ITS, a method of communication that the drivers in Antwerp are familiar with. In addition, the single-direction flow of traffic and absence of junctions in the tunnels reduces weaving. Except at times when there are incidents on other parts of the major road network, projections indicate that flows in the tunnel will be sufficiently below capacity, even in the peaks (due to tolling) that vehicle spacings will be comfortable.

Tunnels are protected from severe weather conditions. The transition from cover to uncovered conditions may pose a potential risk to vehicles as drivers can be influenced by a sudden change in illumination when exiting a tunnel and experience 'daylight eclipse'. To overcome this, higher intensity lighting is normally installed in a tunnel, and this is the intention for the 4th Option crossing.

The wide lanes (3.75m) and gentle curvature (min 1200m) of the proposed tunnel provide good sight lines for drivers.

In the event of an incident there can be limited access to and from a tunnel and limited space to move a vehicle involved in an incident however, sufficient space is provided within the proposed crossing for other vehicles to pass. Immediately the automatic accident detection via CCTV has detected an incident, an operator will activate the lane closure indicators, and traffic will be diverted around the incident. This will also provide space to move vehicles following an incident. More remote ITS will direct traffic flows away from the incident tunnel. A diagrammatic illustration of this arrangement is given in 9.3.2 – Lane Configuration. The tunnel will also be fitted with cross passages at regular intervals to allow passenger evacuation and emergency services intervention from the unaffected tunnel.

The issues identified above apply equally to the immersed tube tunnel under the Schelde proposed in the Bridge Option.

Bridge

There are several bridges in the Antwerp region crossing the River Schedle, including the:

- The Temse
- The Dendermonde)

There are also many short bridges crossing highways and railways.

Bridges are usually uncovered except double decker bridges and are susceptible to different weather conditions, especially to strong wind. Bridges also benefit from natural lighting during the daytime hence providing drivers with better visibility, with the exception of drivers on the lower deck of a double deck bridge.

Bridges generally have lower accessibility in the event of an incident than on an open road as space is limited on a bridge deck however; if a hard shoulder is present this provides a means of access and space to move vehicles following an incident.

The majority of the larger bridges in the Antwerp Region are either on main roads or motorways therefore the majority of drivers that and are future potential users of the

proposed River Schelde crossing will be experienced in driving on bridges. However, the proposed Bridge Option incorporates a double decker bridge. Therefore, it is unlikely that drivers will be experienced and familiar with driving on a double decker bridge. This should not be a concern. In practice, the experience on the upper deck will be much like a normal bridge. The lower deck will be more akin to a short and well lit tunnel.

Summary

A summary of the different road types is given in table xx below.

Table *Comparison of different road type in terms of traffic safety*

	Open land	**Bridge**	**Tunnel**
Exposure to weather conditions	Exposed to all kinds of weather conditions	Susceptible to strong wind except where shielded.	Covered from severe weather conditions
Drivers visibility	Unblocked sightline	Acceptable	Acceptable
Accessibility	Relatively high on minor roads and limited on motorways	Limited	limited
Illumination	Benefit from natural daylight, yet exposed to bad weather and no illumination at night .	Same as open land except lower deck or a double bridge	Lighting system to avoid daylight eclipse
Mechanical Ventilation	Not required	Not required	Required

Hazard Analysis and Risk Analysis

The objective of the hazard analysis is to review the risks and the causative influences, where possible avoided and elsewhere mitigated, either with technical systems or procedures. This ensures, so far as reasonably practicable, that the risks associated with the infrastructure are individually tolerable or acceptable, and the overall risk is comparable with that of other infrastructure.

There is a dynamic interplay between the measures identified in legislation, codes and standards and those that are naturally identified in the course of the hazard identification and mitigation process.

The current analysis is based on the work undertaken for the previous study, in which a bored tunnel option was assessed for compliance with the European Tunnelling directive. With the proposed configuration it was found that the tunnel complied with the directive, and consequently there is a sound basis to show that proposed measures will provide the high standard of safety expected on a trans-European highway. The Directive requires a risk analysis, and this section is the next stage in detailing that element of the work.

Cause and Effect diagram of primary hazards in road tunnels

The above diagram indicates the main causes of problems in tunnels. The following sections discuss the hazards in turn and briefly discuss the mitigations proposed for the new Schelde crossing in relation to the above diagram.

Difference in speed

Difference in speed, between users (which move and therefore need constant attention) and between users and the roadside signs and structures which can become an issue if for example there is mechanical failure in a vehicle or a driver becomes incapacitated.

The design speed for the tunnel is 90 kmh

Mitigation: Dual tunnel

Dual tunnels with unidirectional traffic eliminate the risk of head-on collisions. This is a key requirement of the EU Tunnelling Directive for high volume traffic flow and is implicit in the 2*3 configuration of the proposed tunnel.

Mittigation: Traffic Density control

The new crossing will add over 30% to the total capacity of crossings in Antwerp. Further, in all scenario considered, the toll on the new crossing will be high relative to other crossings. Consequently, the volume of traffic will not be as high as on the Kennedy. Model results indicate 60% capacity even in peaks (with 3% projected growth per year included in the models). Only in the event of an incident on another crossing will flows rise to a level where densities become a concern. In such circumstances, the mandatory speed limit could be lowered. This is not proposed in the conforming scheme, but all the technology will be in place to implement this solution.

Mitigation: Lane configuration

Each bored tunnel will have 3 lanes of unidirectional traffic. In normal operation, slow vehicles can use the slow lane and overtaking traffic can move outwards. At capacity, users tend to find a compromise between closer spacing and lower speed, and self-regulate. The most difficult situation is when flow transitions from fast, open flow, to congested flow. For this Intelligent Traffic Systems are most effective (below).

Each lane is 3.75m wide which is greater than the EC Directive standard of 3.5m. The increased lane width allows for vehicles to pull over if needed (most road vehicles being in the range of 2-2.4m wide - see diagram below.

Pull over of vehicles with following traffic continue to flow through. This is not equal to a hard shoulder, but is appropriate to sections of high cost infrastructure where the value of the additional lane in normal operation is judged to be high. (Common practice in tunnels in Antwerp and proposed for the new immersed tube tunnel also).

Mitigation: Speed control - Variation in mandatory speed limit

Generally, drivers regulate their speed appropriately to the conditions. The most difficult situation for them is when conditions ahead change quickly and they are travelling at high density and speed.

Mandatory speed limit in the peaks could be lowered with advantage. Variable message signs and variable, mandatory speed limit signs facilitate the maintenance of driver-controlled, free-flow. This is proposed for the crossing and the rest of the network.

Statistics show that traffic volume normally increases with speed to 50km/h. Above this speed only a small increase in traffic flow is achieved which peaks at about 70km/h; this is because the distance between vehicles has to increase as speed

increases. Lowering the speed limit generally improves road safety. Limiting maximum speed to 60-70kmh at peak times would enhance traffic safety and minimize incidents with limited impact on through flow and overall travel times.

The overall principle is that lower speed, steady flow is better than stop-start, both in terms of safety and average speed, and this has been demonstrated in practice.

Mitigation - Limitations on access/No junctions

A tunnel, by its nature has limited access and egress, which prevents weaving of traffic flow. By eliminating the Oosterweel junction, the 4th Option increase junction spacing to that more appropriate to a primary route, a problem on the entire R1.

Limited visibility and lack of comprehension

Drivers are very experienced in dealing with normal traffic situations. However, when their ability to interpret the situation diminishes, their attention is distracted or new conditions arise, their performance deteriorates.

Mitigation: Lighting

Like a street at night, a tunnel environment requires illumination. A road tunnel must provide reliable, sufficient and user friendly lighting to road users. It is usual to adopt a relatively light and reflective surface for the internal surface of the tunnel and clean this regularly in order to diminish lighting requirements.

The illumination density should gradually reduce from the portal approach towards the interior of tunnel to avoid the effect of a sudden eclipse. Transitional lighting is designed to allow drivers to adapt to the change.

Mitigation: simple, uniform interior with clear signage

Generally, modern practice is to minimize the amount of information and distraction which the driver has to interact with in a tunnel. Some variation in alignment is acknowledged to be good practice, to avoid boredom. These conditions will be replicated although the possibility of very slowly varying lighting colour to simulate external conditions and relieve tedium is a concept under development (not applied in the base scheme.)

Mitigation: Communications

As highlighted with regard to Intelligent Traffic Systems, it is helpful to provide updated traffic information to road users in tunnels.

A control and management centre with 24 hours a day cover will be provided for tunnel operations, including traffic supervision and maintenance. Emergency management plans are required for all tunnels.

Traffic signals should be provided before the tunnel entrance and every 1000m along the tunnel to keep motorists up to date with the traffic information.

Communication systems should provide radio broadcasting for the emergency services and emergency radio messages for tunnel users. Loudspeakers will be installed in the entrance and emergency exits for communication during an emergency evacuation.

Emergency centres, fitted with a telephone, will be located every 100m to allow tunnel users to communicate with the personnel in the control centre in the event of an incident.

It is noted that tunnel ITS is part of a far wider network of ITS which is proposed in the 4th Schelde crossing scheme.

Inability to Stop/Steer

If a broken-down vehicle or vehicles involved in an incident are not able to clear the carriageway the drivers of the following traffic may not have time to stop or steer to avoid them before colliding.

Mitigation - Sufficient space for vehicles to pull over

Each lane is 3.75m wide which is greater than the EC Directive Standard of 3.5m. The increased lane width allows for vehicles to pull over when needed (most vehicles being in the range of 2-2.4m wide). This is illustrated in the diagram in Difference in speed, Mitigation – Lane Configuration.

Model results indicate that in practice, one lane could be marked as out of service without adversely impacting traffic densities on the other lanes. However, this has not been included in the conforming scheme as this complicates and distracts from more fundamental issues differentiating between the tunnel and bridge options.

Mitigation – ITS lane closure and diversion of traffic

Following incident detection, an operator can signalize the affected lane as closed with immediate effect, adjust the mandatory speed limit in other lanes and redirect traffic around the greater network through variable message signs, keeping drivers informed well away from the incident. By these means the scale of consequence is minimized.

Mitigation - Removal of incident traffic

The removal of broken down vehicles or vehicles involved in an incident alleviates the hazard of drivers colliding into them and therefore; a management strategy will be in place to ensure such vehicles are removed from the tunnel as quickly as possible. The Antwerp traffic authorities already use a vehicle removal service called FAST for all incidents on the higher level road network and the same system would be used in the tunnel.

Accidents/Breakdown

The impact of accidents and breakdowns in a tunnel ranges from no noticeable impact if the effected vehicle can pull over to the side to allow the following traffic to pass, to delays if the effected vehicles block a carriage way, to a major incident if the following traffic is unable to stop or steer to avoid the effected vehicles.

Mitigation – Early identification of incident through coms

Early identification of an incident is essential to prevent further collisions and to maintain traffic flow. To achieve this, the tunnel will be installed with a tunnel monitoring system that will automatically detect a traffic incident via CCTV. This system is already in operation on the Antwerp higher level road network. Once identified, the tunnel management plan to close the lane and remove the effected vehicles in as quick a time frame as possible will be immediately implemented.

Escalation

Should a break down or incident occur in the tunnel, the worst case scenario is that the situation escalates causing a hazard to drivers.

Mitigation: Information, re-routing and early removal

A control centre will be provided at the tunnel, however in normal operation this facility will route all information to the central Antwerp highway control system. This ensures overall integrated management of the highway system. The staff in the control centre will have the ability to communicate with the motorists in the tunnel to inform them of the evacuation procedure and will also be able to prevent drivers from entering either or both tunnels. Communication will be by traffic signals, loud speakers installed at all cross passages or radio. Once the tunnels are clear, the emergency services can enter the tunnel and or the incident vehicles can be safely removed.

This system also allows for the safe passage of drivers to refuge, if required and quick removal of the incident vehicles to enable normal operation to be restored in the tunnel therefore causing minimum disturbance to the regional traffic flows

Fire

Fire can be a significant hazard in a tunnel if mitigation measures are not adequately installed to allow the drivers a means of egress to a safe place of refuge.

Mitigation: Limitation on access

It is important that as many vehicle types as possible can pass through the higher road network in the Antwerp region as possible, both for ease of flow of goods, but also because control and prohibition are require resources to ensure enforcement.

Explosives are prohibited across the network except by special permission. This is relatively easy to enforce as registered explosives are handled by a small and well regulated community.

Most other classes of ADR (registered dangerous goods) present no special problems within a tunnel. However, volatile liquids (Class C) do deserve special consideration. In line with the proposal for the immersed tube option, it is recommended that these are prohibited on the new crossing and routed via Liefkenshoek. By the addition of fire suppression, recommended in the refined scheme, use of the Kennedy tunnel for these vehicles might be considered, but this would be the subject of a separate risk assessment.

In the event of an incident, tunnel operators and emergency personnel in the control centre would be notified by the incident monitoring system. Drivers would be informed to stop entering the tunnels by traffic signals at the tunnel entrances. Gates could also be provided to increase the level of enforcement. Depending on the circumstances of the incident, traffic inside the tunnel would be instructed to slow down or stop by traffic signals and be informed of the incident ahead of them. Communication would be by ITS emergency radio broadcasting and loudspeakers. Modern telecommunications can enable the radio signal to break-in over the channel to which a user is listening on what ever frequency.

It is noted that on the M30 in Madrid, trucks over 7.5 tons are prohibited in the current operating scenario. However, this is under review. There is no fundamental

reason that freight traffic has been prohibited. Rather, it was imposed as a precaution because anticipated traffic flows were extremely high. In the case of the new crossing, predictions indicate that flows would be below maximum capacity for a two lane highway except in exceptional circumstances. Consequently this is not a governing consideration. The provision of three lanes in normal operation is a prudent design choice as laid out in the preconditions.

Mitigation: Fire suppression

It is not proposed to use an active, automatic fire suppression system in the tunnel.

A suppression system uses a mist of fine water droplets which are released through high pressure nozzles. The mist significantly lowers the ambient temperature in the tunnel, which in conjunction with the evaporating water choking the oxygen supply, controls the fire. The only negative of such a system is that it reduces visibility.

Emergency stations will be installed at every 100m for both motorists and emergency services personnel with telephones, extinguishers, hydrants system and hose reels for fire fighting.

Fire extinguishers will be installed at regular intervals along the tunnel alignment and will be non-combustible and not emit toxic fumes when subject to heat or fire.

Wet fire-mains will also be provided to hoses at fire-points, every 100m.

The fire services are also investigating new technology which can quench even intense fires at large distances. For example, the Turbo-luscher system can generate a jet of fine mist which rapidly removes heat from a fire and can thereby quench even large hydrocarbon fires. This system is well suited to tunnels with semi-transverse ventilation as the mist is drawn along by the ventilation system. The mist is non-hazardous in itself and the high degree of smoke extraction achieved by a semi-transverse ventilation system prevents the mixing of soot and water which can often prove challenging in fire situations.

Mitigation: Robustness

The tunnel structures will be designed to meet the fire safety requirements; this includes the tunnel lining having adequate fire resistance to withstand heat to allow evacuation before the structure begins collapse. Structures will have a minimum fire resistance period of 4 hours and be installed with fire protection mesh at all over head beam structures to prevent concrete from spalling. Passive fire protection systems, such as the addition of polypropylene fibres within the concrete, will be used to increase the fire resistance of the structure.

In the unlikely event of a structural collapse at Antwerp, the Boom Clay would demonstrate its stable nature and remain standing after the loss of tunnel support however; should a collapse occur in the unstable wet sand this material would collapse and migrate into the tunnel. In the case of a collapse in the wet sand, tunnel repair work would almost be impossible.

Mitigation: Emergency Escape and Access (with Walkways)

In the case of a fire caused by a car crash for which the continuous flow of traffic is impossible or deemed unsafe, traffic will be instructed to pull to one side and to stop and the emergency lighting and ventilation will be activated. Motorists will be directed by the emergency personnel in the tunnel control centre to the nearest escape route.

Motorists will escape to the adjacent unaffected tunnel through the nearest cross passage and make their way out of the tunnel along the tunnel walkway to safety. Dual tunnels with cross passages provide the endangered motorist a self-rescue escape route through walkways to the other tunnel.

Well designed signage with clear and self-explanatory information will be in place to indicate to the driver the location of safety equipment and escape routes.

Emergency power supply to provide emergency lighting and ventilation and ensure the functioning of safety equipment during evacuation will be installed.

Mitigation: Emergency Service Access

Emergency service teams will access the scene of incidents through the unaffected tunnel and the closest cross passage as soon as the traffic inside is cleared. The incident vehicles are then removed from the tunnel and any necessary repair work undertaken to ensure safe operation of tunnel before the resumption of services.

Where the access of emergency service vehicles is not possible, emergency rescue teams can access the incident scene from the emergency personnel intervention shaft. With the help of the fire ventilation system, the fire services can use the installed fire fighting equipment to control and extinguish the fire.

Mitigation; Slot Drains

Slot drains will be installed along the tunnel for the removal of flammable and toxic liquids to the lower deck below the carriageways to reduce the risk of a fire spreading.

Smoke

Smoke in a tunnel can be as destructive as heat from a fire as the fumes can suffocate drivers and reduce visibility, preventing drivers from finding their way to a place of refuge.

Mitigation: Ventilation (end to end, semi-transverse)

For the 4th Option tunnel transverse and longitudinal ventilation will be installed. The longitudinal ventilation system will introduce fresh air at one end of the tunnel and the polluted air will be extracted perpendicular to the tunnel axis.

The transverse ventilation will be installed by the provision of a ventilation shaft half way along the tunnel. In addition, air ducts with a total cross section up to 30m2 will be installed in the tunnel crown and in the cross passages to provide additional transverse ventilation to the main running tunnels.

The blowing direction of the ventilation fans is reversible for smoke extraction in case of fire.

In the event of a fire outbreak, the smoke detectors will activate the fire ventilation system. This involves the control of the longitudinal air velocity and at the same time the extraction of smoke in a limited section around the fire, providing more time for the evacuation and rescue.

Mitigation: Efficient Escape Routes

Ventilation is of great importance for fire fighting as the extraction of smoke ensures visibility to the escape routes.

Explosion

An explosion inside the tunnel is a significant hazard to drivers and can lead to further complications, such as fire therefore, measures to prevent explosions should be operational at all times.

Mitigation: Limit on access (practicable to control most fuels)

While it is ideal to prohibit all hazardous goods vehicles from using a tunnel, it is proven to be impracticable and therefore, the passage of hazardous goods should be managed. The passage of such materials will in all circumstances be brought to the attention of the Control Centre, who will either segregate it from other vehicles or will monitor its passage through the tunnel, depending on its hazard profile.

Vehicle Emissions

Vehicle emissions are an unavoidable side effect of a road system however, measures can be put in place to reduce the levels to as low as possible.

Mitigation; Gradually improving emissions standards, gradients

Continuing to work with the vehicle industry to improve emissions will gradually reduce pollution experienced in tunnels and else where on the road networks. Emissions can also be kept to a minimum by maintaining gradients to as low as possible as the steeper the gradient, the greater the effort and therefore the greater the emissions released by vehicles

Poor Air Quality

Due to the emissions released by vehicles and the confined nature of a tunnel, the air quality in a tunnel has the potential to be poor.

Mitigation: Ventilation

Installation of mechanical ventilation is required due to the inherent dirtiness of the mode of transport. The ventilation allows the circulation of fresh air and the removal of pollutants. The capacity of the ventilation system is a limiting factor to the design length of a tunnel. The amount of ventilation required depends on the tunnel diameter, length, traffic volume and traffic speed. Unidirectional traffic flows have better aerodynamics performance which assists with tunnel ventilation.

For a short tunnel (< 1km) with a medium traffic load, ventilation can be accomplished by the pressure difference between the portals and also by the piston action of the vehicles. For longer tunnels or tunnels with higher traffic volumes, high thrust jet fans are required to be installed with a spacing of about 10 tunnel diameters to boost the longitudinal ventilation. However, for a tunnel of 4km, semi-transvers or transverse ventilation is strongly preferred as this controls and removes smoke from the carriageway more swiftly and effectively.

Concluding remarks.

The above analysis demonstrates that the proposed tunnel for the 4th Option crossing of the Schelde is based on conventional technology, will add to a highway system already incorporating many of the technologies proposed, and consequently familiar to road users.

There are differences between the bored tunnel proposed in this option and the immersed tube, both having merits and demerits. However, both systems are in common use, and taken together, it is judged that both will have a comparable level of safety and be able to carry nearly all categories of vehicles, with prohibitions restricted to the same classes of vehicle.

A9
ANALYSIS OF PORT TRAFFIC

1.1 INTRODUCTION

This technical appendix presents an analysis of road traffic operations relating to the Port of Antwerp.

This note is structured as follows:

- Section 2 presents a review of the existing heavy goods vehicle (HGV) demand within the study area, both for port-bound and through traffic, and movements that are likely to use the Oosterweel crossing;
- Section 3 assesses the disruption to road traffic due to the lifting bridges and train shunting movements within the Port of Antwerp; and
- Section 4 details the anticipated future development plans, future modal splits and goods vehicle growth for the Port of Antwerp.

1.2 EXISTING HEAVY GOODS VEHICLE MOVEMENT

1.2.1. Overview

In 2006, the Port of Antwerp carried out an 18 hour truck survey which identified the origins and destinations (OD) of heavy goods vehicles (HGV) associated with the port and through traffic. The survey used number plate matching techniques. Number plates were recorded using cameras at the locations shown in Figure 2.1.

Three types of trip movements were surveyed:

- Through movements representing the longer-distance HGV transit movements (which do not stop in the Port);
- External HGV movements to and from the Port area; and
- Internal HGV movements within the Port area (i.e. goods vehicle movements between the Left Bank and Right Bank, and within the Port areas on the Left or Right Banks).

Table 2.1 shows the total number of HGV trips for each trip type. Table 2.2 shows a detailed summary of port trips.

Table 2.1: Summary of Total Trips for All Trip Types

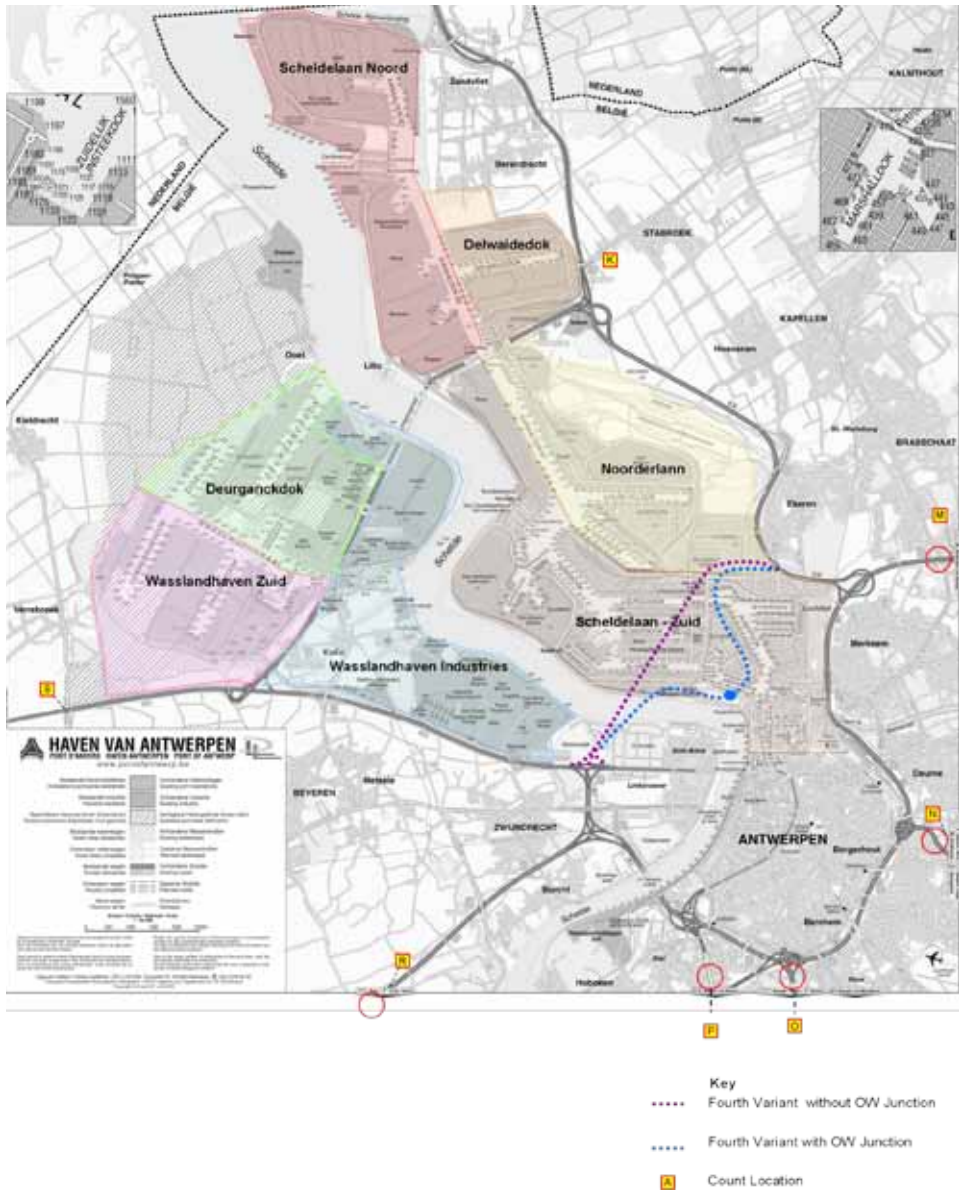
Trip Type	Total HGVs
Port to Port	7.591
External to Port	9.368
Port to External	9.860
External to External	30.941
Local to External	3.697
External to Local	4.203
Total	65.660

Table 2.2: Detailed Summary of Port Trips

From / To	Right Bank	Left Bank	External (CR)	External Other	Total
Right Bank	3.476	1.988	1.918	5.389	12.772
Left Bank	1.745	382	1.833	720	4.680
External (Cross River)	1.711	2.013	-	-	3.724
External (Other)	5.081	562	-	-	5.644
Total	**12.014**	**4.946**	**3.751**	**6.109**	**26.819**

The summary of the survey data shows that the majority of HGV trips within the area are through movements. A large proportion of trips are also made between the external area and the port. Out of the trips associated with the port, 42% are crossing the Schelde and of these 33% are internal port movements.

Figure 2.1: Survey Locations



Source: Port of Antwerp

The survey demonstrates that just over 50% of the good vehicles accessing the Port are carrying containers, and approximately 11% are tankers. The composition of Port traffic is very different from through (transit) traffic where less than 10% of vehicles are carrying containers. Also, over 60% of the goods vehicles accessing the port have a Belgian numberplate. Only 25% of the through traffic is Belgian.

The survey indicated that over 30% of goods vehicles coming to the Port from the strategic road network approach Antwerp on the E34/E313. Approximately a quarter of traffic approaches from the west (E34 and E17), 21% from the south (A12 and E19) and 23% from the North (E19 and A12). The distribution of external to internal port HGV traffic movement is shown in Table 2.1.

Table 2.1: Distribution of External to Internal Port Truck Traffic

Strategic Route	**(05:00-23:00) Weekday Flows**	
	Goods Vehicles	**% Goods Vehicles**
E34 West	757	8.00%
E17 West	1350	14.00%
A12 South	784	8.00%
E19 South	1186	13.00%
E34/E313 East	3092	33.00%
E19 North	1223	13.00%
A12 North West	976	10.00%
Total	**9368**	**100.00%**
Percentages subject to rounding		

Source: Port of Antwerp

Using the survey data, an assessment was carried out of the in-scope trips which would be considered to use the new Oosterweel Crossing. The assessment was based on the Fourth Variant with a number of assumptions made applied to determine in-scope trips; in particular it was assumed that the Kennedy Tunnel was banned to HGV traffic.

1.2.2. Method of Analysis of In-Scope Trips

An indicative analysis was carried out which assigned the surveyed HGV trips to the Oosterweel Crossing based on an assessment of whether the tunnel will provide a shorter or a faster route compared to existing routes. The following assumptions were made in relation to different trip types:

- Through movements trips were assigned to the new Oosterweel Crossing based on the assumption that it will provide a more convenient route compared to their existing routes;
- External movements to and from the Port area were assigned to the new Oosterweel Crossing based on the assumption that traffic currently using the Liefkenshoek Tunnel will continuing using this crossing with the introduction of the new Oosterweel Crossing; and
- Internal movements within the Port area were assigned to the new Oosterweel Crossing also based on the assumption that traffic currently using the Liefkenshoek Tunnel will continuing using this crossing with the introduction of the new Oosterweel Crossing.

1.2.3. Key Assumptions

Key assumptions were used in the analysis below, as follows:

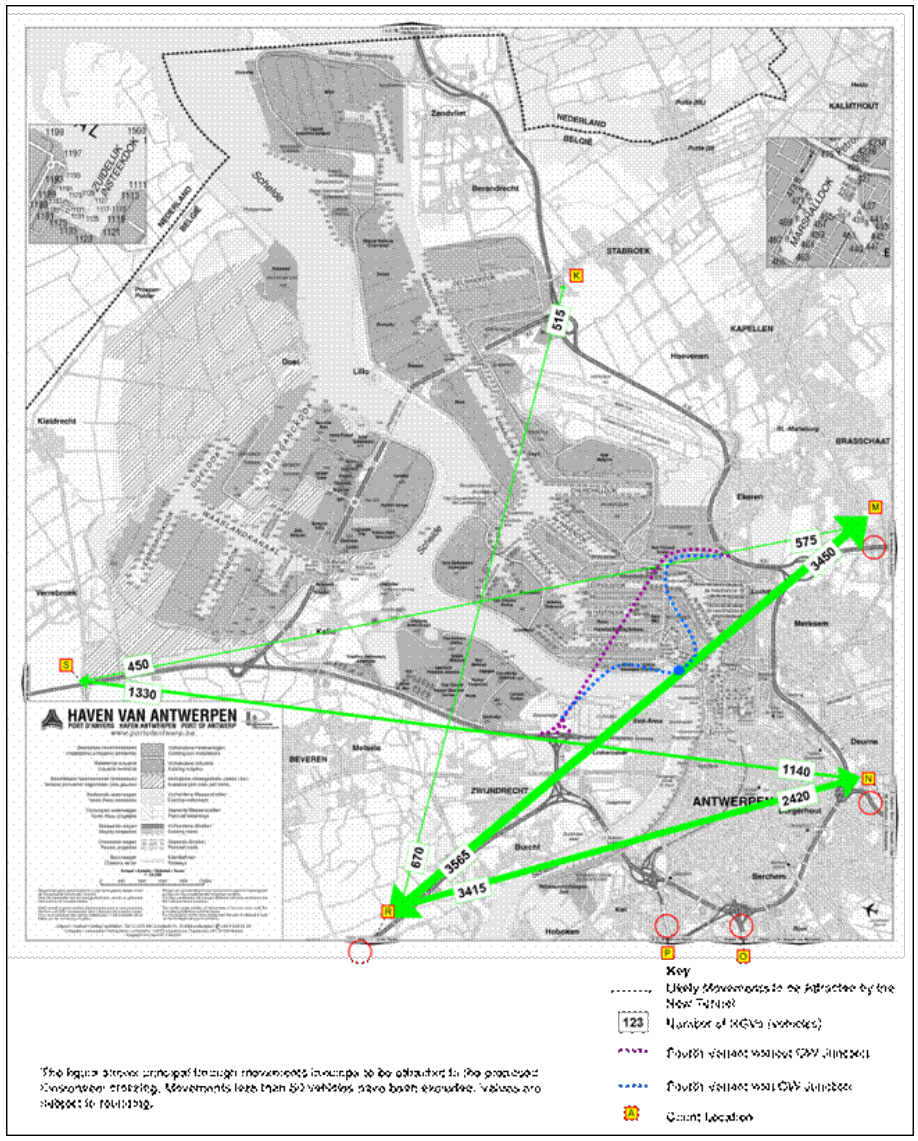
- the Fourth Variant alteration of the new Oosterweel crossing was used to assess the in-scope trucks;
- the Kennedy tunnel is not accessible for trucks;
- Trips only transfer from the Liefkenshoek Tunnel to the new Oosterweel crossing if the Oosterweel crossing is considered to provide a shorter or faster route for each of the truck flows between the surveyed origins and destinations; and
- All trips have been assigned to the new Oosterweel crossing based on it providing a convenient (i.e. shorter or faster) route to/from its origin/destination and taking into account that the Kennedy Tunnel is not accessible for trucks.

1.2.4. Throug h Movement Findings

Figure 2.2 shows the desire lines for the 18 hour HGV volumes of through movements that are in-scope to use the new Oosterweel Crossing based on the above assignment methodology and assumptions. The desire lines were based on the analysis of HGV movements as shown in Table 2.2 for through (transit) HGV trips. This table shows the full HGV trip matrices derived from the survey and highlights the HGV movements which were in-scope to transfer to the new Oosterweel Crossing if goods vehicles are banned from the Kennedy Tunnel.

Currently there are approximately 30,950 through (transit) movements per 18 hours within the study area of which approximately 17,600 are considered in-scope for switching to the Oosterweel tunnel.

Figure 2.2: *Principal Through HGV Movements in-scope to use the Oosterweel Crossing (18 Hour Flows)*



This figure shows principal through movements (example) to be attracted to the proposed Oosterweel crossing. Movements less than 50 vehicles have been excluded. Values are subject to rounding.

Table 2.2: Through HGV Movements – Origin-Destination Trip Matrix, 2006 Weekday (18 hours)

Uitgaand verkeer																
From Zone	**To Zone (18 Hour Flows)**												**18 Hour Total**	**24 Hour Total**	**HGVs Likely to Transfer to Oosterweel Crossing**	
	S	**S2 via LHT**	**P**	**O**	**R**	**R via LHT**	**N**	**N via LHT**	**M**	**M via LHT**	**K**	**K via LHT**			**18 Hour Total**	**24 Hour Total**
R (E17 Haasdonk)	6	0	62	223	0	0	2.409	10	3.346	106	515	170	**6.847**	**8.449**	**6.386**	**7.880**
S (N49 Verrebroek)	58	0	30	216	10	0	1.097	40	444	130	16	193	**2.233**	**2.756**	**1.727**	**2.131**
P (A12 Boom)	74	0	0	0	10	0	590	0	625	0	147	7	**1.454**	**1.794**	**0**	**0**
O (E19 Edegem)	201	0	0	0	208	0	982	0	1.921	0	330	0	**3.642**	**4.494**	**0**	**0**
N (E34 Wommelgem)	1.270	61	618	1.028	3.402	12	0	0	849	0	541	0	**7.781**	**9.602**	**4.745**	**5.856**
M (E19 Brasschaat)	389	63	475	1.759	3.538	26	586	0	0	0	127	0	**6.962**	**8.591**	**4.015**	**4.955**
K (A12 Stabroek)	40	284	107	352	363	306	457	0	113	0	0	0	**2.022**	**2.495**	**709**	**875**
18 Hour Total	**2.038**	**408**	**1.291**	**3.578**	**7.531**	**343**	**6.121**	**49**	**7.298**	**237**	**1.677**	**370**	**30.941**	**-**	**17.582**	**-**
24 Hour Total	**2.515**	**503**	**1.593**	**4.415**	**9.294**	**424**	**7.554**	**61**	**9.006**	**292**	**2.069**	**457**	**-**	**38.183**	**-**	**21.697**

Notes: LHT - Liefkenshoek Tunnel; Grey cells – movements in-scope to transfer to the Oosterweel Crossing with a truck ban in the Kennedy Tunnel.

Source: Port of Antwerp

1.2.5. External – Internal Movement Findings

Figure 2.3 shows the desire lines for the 18 hour HGV volumes of external – internal movements that are in-scope to use the new Oosterweel Crossing based on the assignment methodology and assumptions described in section 2.3. The desire lines were based on the analysis of HGV movements as shown in Table 2.3 for HGV trips to and from the Port. This table shows the full HGV trip matrices derived from the survey and highlights the in-scope HGV movements which were considered likely to transfer to the new Oosterweel Crossing.

The analysis showed that there are 19,200 HGV trips to and from the Port in 18 hours of which only 4,000 are in-scope trips likely to use the Oosterweel Crossing.

Figure 2.3: *Principal HGV Movements to and from the Port in-scope to use the Oosterweel Crossing (18 Hour Flows)*

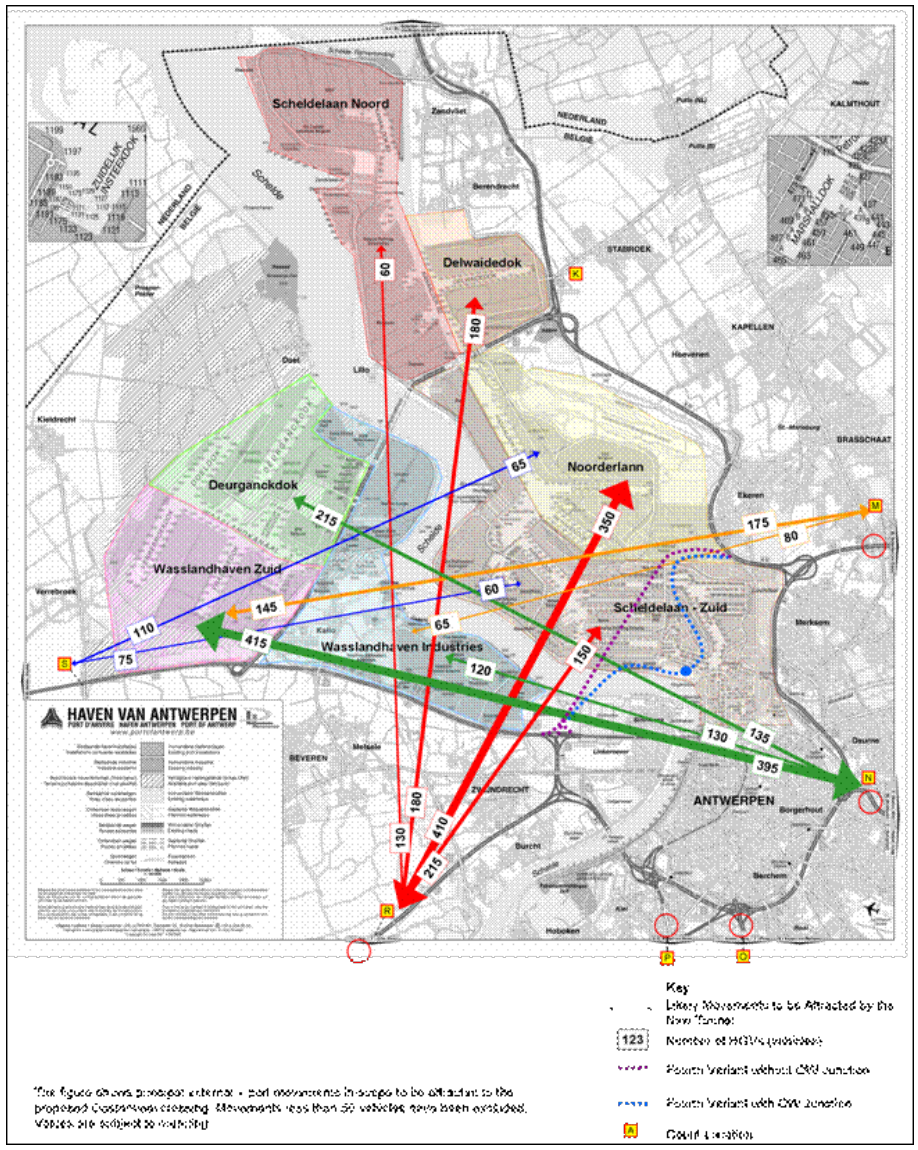


Table 2.3: HGV Movements To and From the Port – Origin-Destination Trip Matrix, 2006 Weekday (18 Hours)

Inkomend verkeer																			
From Zone	**To Zone (18 Hour Flows)**																**HGVs Likely to Transfer to Oosterweel Crossing**			
																	18 Hour Total			
	Wasslandhaven Industries	Wasslandhaven Industries via LHT	Wasslandhaven Zuid	Wasslandhaven Zuid via LHT	Deurganckdok	Deurganckdok via LHT	Noorderlaan	Noorderlaan via LHT	Scheldelaan - Zuid	Scheldelaan - Zuid via LHT	Scheldelaan Noord	Scheldelaan Noord via LHT	Delwaidedok	Delwaidedok via LHT	**18 Hour Total**	**24 Hour Total**	**Not stop traffic through tunnel**	**Likely to Use OW Junction**	**Total**	**24 Hour Total**
R (E17 Haasdonk)	11	0	220	0	142	0	347	48	151	38	61	76	182	74	1.350	**1.666**	590	151	**742**	**916**
S (N49 Verrebroek)	2	0	73	0	115	0	64	135	57	74	2	110	15	110	757	**934**	82	57	**139**	**171**
P (A12 Boom)	22	0	171	0	100	0	209	0	114	0	68	8	91	0	784	**967**	0	0	**0**	**0**
O (E19 Edegem)	40	0	196	0	89	2	394	0	200	2	79	1	183	0	1.186	**1.464**	0	0	**0**	**0**
N (E34 Wommelgem)	123	14	413	44	214	27	836	0	615	0	325	0	480	0	3.092	**3.816**	750	0	**750**	**925**
M (E19 Brasschaat)	64	1	144	22	30	31	465	0	272	0	77	0	118	0	1.223	**1.509**	238	0	**238**	**293**
K (A12 Stabroek)	7	72	8	101	0	78	181	0	97	0	15	155	260	0	976	**1.204**	16	0	**16**	**19**
18 Hour Total	**268**	**87**	**1.225**	**167**	**689**	**138**	**2.496**	**183**	**1.507**	**114**	**628**	**350**	**1.330**	**183**	**9.368**	**-**	**1.675**	**208**	**1.884**	**-**
24 Hour Total	**331**	**108**	**1.512**	**206**	**851**	**171**	**3.080**	**226**	**1.860**	**140**	**775**	**432**	**1.642**	**226**	**-**	**11.561**	**2.067**	**257**	**-**	**2.324**

Notes: LHT - Liefkenshoek Tunnel, Grey cells – movements in-scope to transfer to the Oosterweel Tunnel Crossing with a truck ban in the Kennedy Tunnel.

, Purple cells – movements likely to transfer to tunnel if Oosterweel junction is constructed.

Source: Port of Antwerp

Table 2.3: HGV Movements To and From the Port – Origin-Destination Trip Matrix, 2006 Weekday (18 Hours)

Uitgaand verkeer																			
From Zone	**To Zone (18 Hour Flows)**																**HGVs Likely to Transfer to Oosterweel Crossing**			
																	18 Hour Total			
	S	S via LHT	R	R via LHT	P	P via LHT	O	O via LHT	N	N via LHT	M	M via LHT	K	K via LHT	**18 Hour Total**	**24 Hour Total**	**Not stop traffic through tunnel**	**Likely to Use OW Junction**	**Total**	**24 Hour Total**
Wasslandhaven Industries	36	0	68	0	9	0	53	0	127	3	82	11	8	48	**445**	**549**	217	0	**217**	**268**
Wasslandhaven Zuid	52	0	312	0	138	2	134	2	395	50	176	61	7	67	**1.397**	**1.724**	578	0	**578**	**714**
Deurganckdok	109	0	142	0	66	1	66	5	133	28	31	44	8	76	**711**	**877**	173	0	**173**	**213**
Noorderlaan	109	138	411	42	156	0	315	0	687	0	490	0	153	0	**2.501**	**3.086**	520	0	**520**	**642**
Scheldelaan - Zuid	76	85	216	92	125	1	208	4	638	0	318	0	91	0	**1.856**	**2.290**	0	293	**293**	**361**
Scheldelaan Noord	18	102	131	110	61	0	129	0	325	0	121	0	325	0	**1.323**	**1.633**	149	0	**149**	**184**
Delwaidedok	11	96	183	89	71	1	126	1	312	0	143	0	593	0	**1.627**	**2.008**	194	0	**194**	**239**
18 Hour Total	**411**	**422**	**1.464**	**334**	**627**	**5**	**1.031**	**12**	**2.618**	**82**	**1.361**	**116**	**1.186**	**191**	**9.860**	**-**	**1.831**	**293**	**2.124**	**-**
24 Hour Total	**508**	**521**	**1.806**	**412**	**774**	**7**	**1.272**	**15**	**3.231**	**101**	**1.680**	**143**	**1.464**	**236**	**-**	**12.168**	**2.260**	**361**	**-**	**2.621**

Notes: LHT - Liefkenshoek Tunnel, Grey cells – movements in-scope to transfer to the Oosterweel Tunnel Crossing with a truck ban in the Kennedy Tunnel.

, Purple cells – movements likely to transfer to tunnel if Oosterweel junction is constructed.

Source: Port of Antwerp

1.2.6. Internal Movement Findings

Table 2.4 presents HGV trips within the Port showing the full HGV trip matrices derived from the survey and highlighting the in-scope HGV movements assumed to transfer to the new Oosterweel Crossing. The analysis includes an assessment of the end to end traffic in-scope to use the Oosterweel Crossing and the traffic in-scope to use the Oosterweel Junction. The analysis showed that there are 3,700 internal movements across the Schelde within the Port of which only 600 are in-scope to use the Oosterweel Crossing.

Table 2.4: Internal Movements Within the Port - Origin-Destination Trip Matrix, 2006 Weekday (18 Hours)

From Left Bank to Right Bank														
From Zone	**To Zone (18 Hour Flows)**										**HGVs Likely to Transfer to Oosterweel Crossing**			
											18 Hour Total			
	Noorderlaan	Noorderlaan via LTH	Scheldelaan - Zuid	Scheldelaan - Zuid via LTH	Scheldelaan Noord	Scheldelaan Noord via LTH	Delwaidedok	Delwaidedok via LTH	**Totaal**	**24 Hour Total**	**Through movements**	**Likely to Use OW Junction**	**Total**	**24 Hour Total**
Wasslandhaven Industries	21	7	8	37	0	68	2	85	**228**	**282**	24	8	**32**	**39**
Wasslandhaven Zuid	72	205	46	75	4	119	8	141	**671**	**828**	84	46	**130**	**160**
Deurganckdok	37	269	21	54	7	147	10	302	**846**	**1.044**	54	21	**74**	**92**
18 Hour Total	**130**	**481**	**74**	**165**	**11**	**334**	**20**	**528**	**1745**	**-**	**162**	**74**	**236**	**-**
24 Hour Total	**161**	**594**	**92**	**204**	**13**	**412**	**25**	**652**	**-**	**2.153**	**199**	**92**	**-**	**291**

Notes: LHT - Liefkenshoek Tunnel, Grey cells – movements in-scope to transfer to the Oosterweel Tunnel Crossing, Purple cells – movements likely to transfer to tunnel if Oosterweel junction is constructed.

Source: Port of Antwerp

Table 2.4: Internal Movements Within the Port - Origin-Destination Trip Matrix, 2006 Weekday (18 Hours)

From Right Bank to Left Bank											
From Zone	**To zone (18 Hour Flows)**								**HGVs Likely to Transfer to Oosterweel Crossing**		
									18 Hour Total		
	Wasslandhaven Industries	Wasslandhaven Industries via LHT	Wasslandhaven Zuid	Wasslandhaven Zuid via LHT	Deurganckdok	Deurganckdok via LHT	**Total**	**24 Hour Total**	**through movements**	**Likely to Use OW Junction**	**Total**	**24 Hour Total**
Noorderlaan	39	65	80	188	92	306	**770**	**950**	211	0	**211**	**260**
Scheldelaan - Zuid	17	37	72	54	20	38	**239**	**295**	0	109	**109**	**135**
Scheldelaan Noord	0	102	6	142	5	151	**406**	**501**	11	0	**11**	**13**
Delwaidedok	2	62	18	203	19	269	**573**	**708**	39	0	**39**	**48**
18 Hour Total	**58**	**266**	**176**	**588**	**136**	**764**	**1988**	**-**	**260**	**109**	**370**	**-**
24 Hour Total	**72**	**329**	**217**	**726**	**167**	**943**	**-**	**2.454**	**321**	**135**	**-**	**456**

From Right Bank to Left Bank

Notes: LHT - Liefkenshoek Tunnel, Grey cells – movements in-scope to transfer to the Oosterweel Tunnel Crossing, Purple cells – movements likely to transfer to tunnel if Oosterweel junction is constructed.

Source: Port of Antwerp

1.2.7. All HGV Movements to and from the Inner Right Bank Port

An analysis was undertaken of the truck traffic to and from the Inner Right Bank port sectors (Scheldelaan-Zuid and Noorderlaan) which would be the focus of traffic generation for a Fourth Variant scheme with a new junction at Oosterweel.

Figure 2.4 and Figure 2.5 show all the 18 hour HGV movements to and from the port derived from the truck survey for Scheldelaan-Zuid and Noorderlaan sectors respectively. The flows presented include flows to and from these port sectors together with internal port movements to and from these sectors. As can be seen the largest truck movements are between the Scheldelaan-Zuid sector and the E19 North, E313/E34 and R2. Much lower truck volumes were surveyed for cross-river movements which would be served by a junction at Oosterweel.

The majority of HGV traffic to and from the Noorderlaan area is entering and exiting eastwards in the direction of the A12 and R1. The origins and destinations for the majority of the truck traffic are towards the E19 North (count location M), E34/E313 (count location N) or south to/from the E19 South A12 South (count locations O and P respectively).

Figure 2.4: 18 Hour HGV Movements to and from Scheldelaan-Zuid Sector

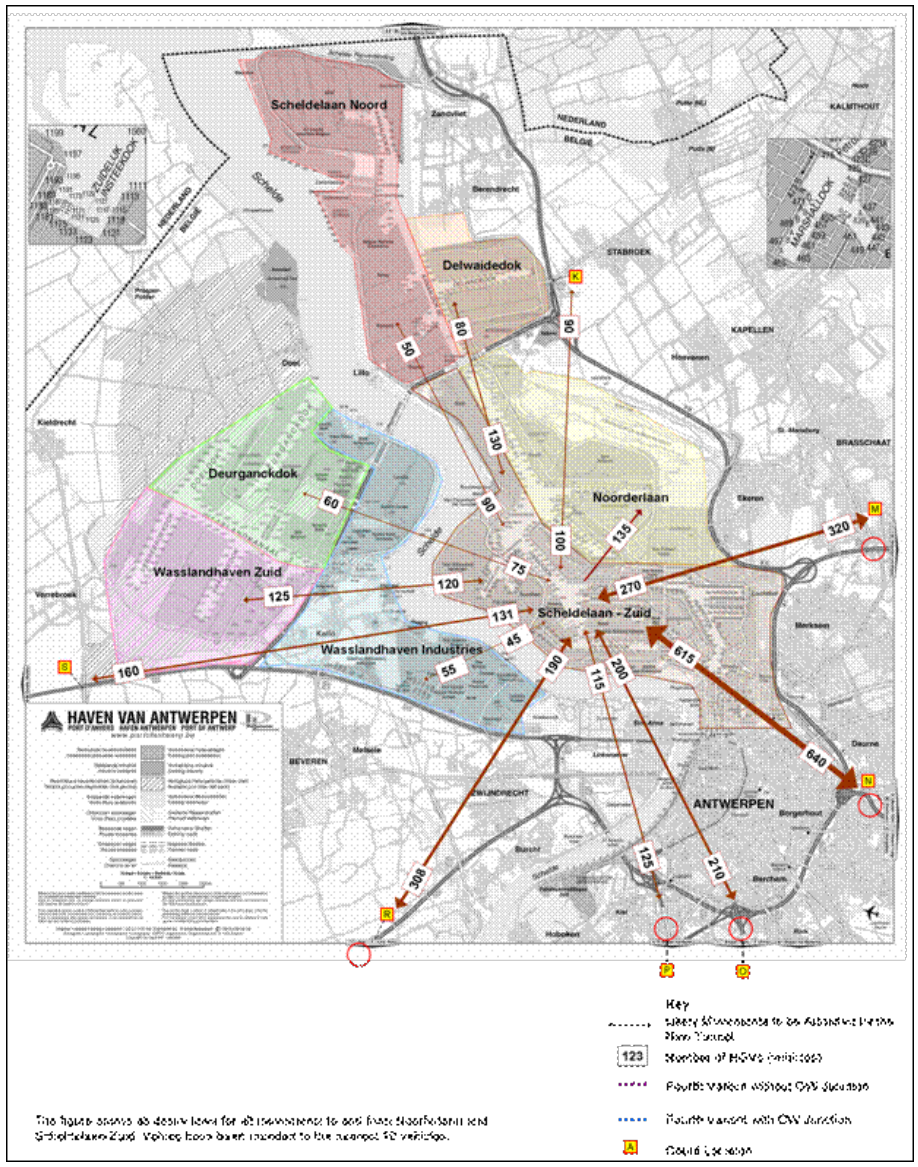
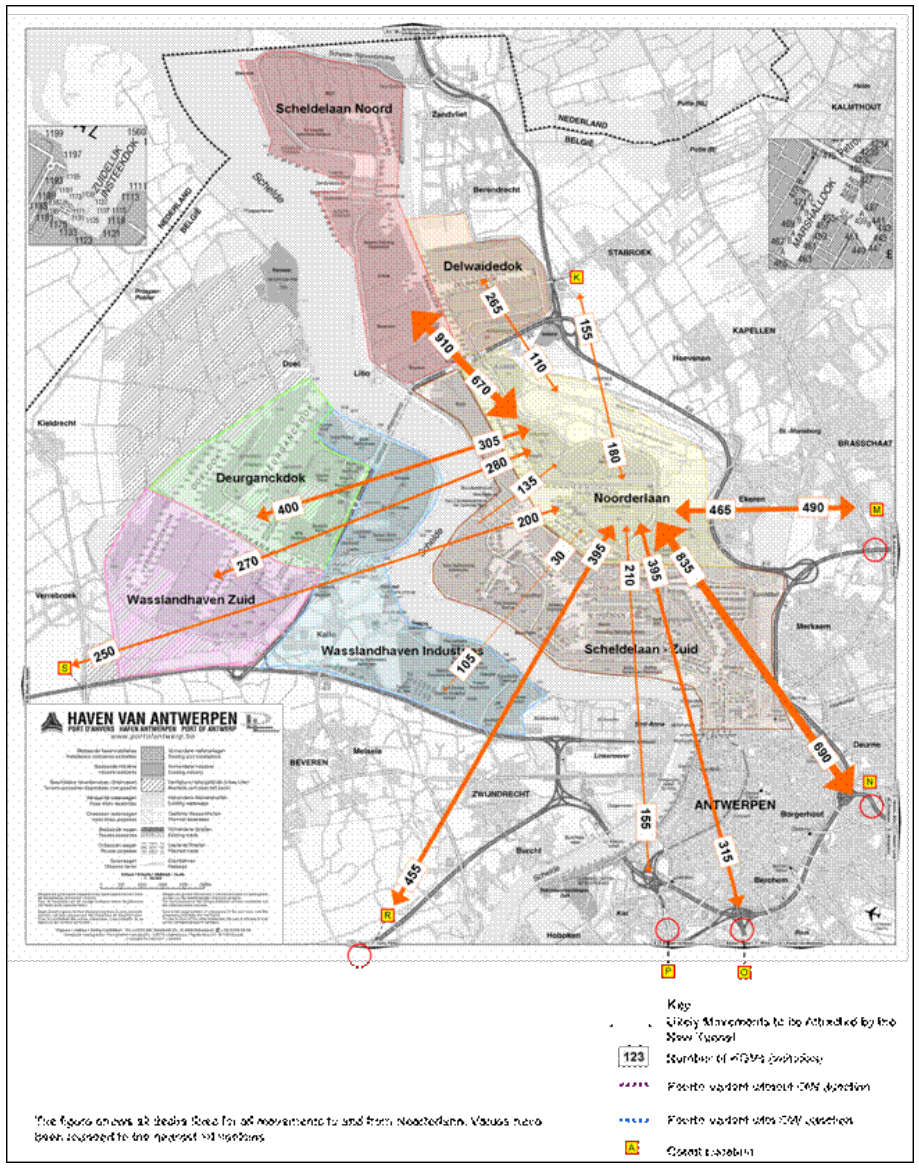


Figure 2.5: 18 Hour HGV Movements to and from Noorderlaan Sector



1.2.8. ADR Traffic Movements

Good road access for ADR movements to and from the Port is essential. Table 2.5 and 2.6 shows the trip matrices for ADR vehicles by direction from the 2006 truck survey.

Table 2.5: ADR Vehicles Inbound to the Port

Strategic Route	ADR Flow (18 hour Weekday)				18 Hour Total	24 Hour Total*
	Left Bank Inner Port	Left Bank Outer Port	Right Bank Inner Port	Right Bank Outer Port		
E17 West	10	4	21	9	**44**	**54**
E34 West	0	1	17	2	**20**	**25**
A12 South	0	2	23	8	**33**	**41**
E19 South	0	0	36	11	**47**	**58**
E34/E313 East	12	18	97	29	**156**	**193**
E19 North	8	0	69	14	**91**	**112**
A12 North-West	0	6	22	10	**38**	**47**
18 Hour Total	**30**	**31**	**285**	**83**	**429**	**–**
24 Hour Total*	**37**	**38**	**352**	**102**	**–**	**529**

Source: Port of Antwerp

Table 2.6: ADR Vehicles Outbound from the Port

Strategic Route	ADR Flow (18 hour Weekday)							18 Hour Total	24 Hour Total*
	E17 West	E34 West	A12 South	E19 South	E34/ E313 East	E19 North	A12 North-West		
Left Bank Inner Port	0	0	0	0	0	0	0	**0**	**0**
Left Bank Outer Port	3	5	2	0	28	5	4	**47**	**58**
Right Bank Inner Port	22	52	22	41	121	55	11	**324**	**400**
Right Bank Outer Port	9	22	6	10	22	6	10	**85**	**105**
18 Hour Total	**34**	**79**	**30**	**51**	**171**	**66**	**25**	**456**	-
24 Hour Total*	**42**	**97**	**37**	**63**	**211**	**81**	**31**	-	**563**

Source: Port of Antwerp

It can be seen that the majority of ADR traffic travels to/from the Right Bank Inner Port. The number of ADR vehicles crossing the Schelde is low, approximately 13% of the total for the Right Bank inner port. The main destinations from this area of the port are to the E19 North and the E34/E313 East.

1.2.9. Summary

In summary, the results suggest that the Oosterweel Crossing in-scope traffic represents just over 41% of the total HGV traffic for through movements, movements to and from the port and movements within the port between the Left and Right Banks.

The E17 West (count location R), E34/E313 (count location N), E19 East (count location M) and A12 North (count location K) are the principal generators and attractors of HGV traffic in-scope to use the new Oosterweel Crossing. The majority of in-scope truck traffic to use the Oosterweel Crossing is estimated to be through traffic (accounting for 80% of the all surveyed truck trips). The remaining 20% of in-scope trucks estimated to use the new Oosterweel Crossing is traffic generated or attracted by the port.

The in-scope traffic assessment indicated that the traffic using a junction in the Scheldelaan-Zuid area of the port would largely be cross-river traffic to/from E17 West and E34 West. This traffic represents only 3% of the total HGV traffic expected to use the new Oosterweel Crossing.

The majority of traffic associated with the Noorderlaan sector of the port would use the A12 Ekeren Junction as the main demand desire lines are principally to/from the E19 North, E34/E313 East and E19 South.

The majority of ADR traffic generated by the Right Bank inner port area is to/from the E19 North, E34/E313 East and E34 West. Cross river movements are low.

1.3 IMPACT OF LIFTING BRIDGES ON PORT ROAD TRAFFIC MOVEMENTS

The analysis of data sets provided by the Port of Antwerp on the operations of lifting bridges in the Right Bank Inner Port area provides an indication of the current disruption to road traffic using the key port access routes via Groenendallan and Oosterweelsteenweg to access the petro-chemical cluster on the Scheldelaan.

Data for four bridges in the area (Oosterweelbrug, Wilmarsdonkbrug, Noordkasteelbruggen, and Siberiabruggen) was analysed in order to understand the typical operational patterns of the lifting bridges on port road traffic. Data supplied by the Port of Antwerp recorded bridge activity for all the four bridges in November 2007 (consecutive Monday to Friday).

1.3.1. Oosterweelbrug and Wilmarsdonkbrug crossings

The Oosterweelbrug is a lifting bridge located on Oosterweelsteenweg, and together with the adjacent Wilmarsdonkbrug (also a lifting bridge), it provides access between Albertdok and Leopolddok for shipping. The lifting of these bridges together with rail freight shunting movements is a source of disruption to road traffic.

The two bridges seem to operate together for the passage of shipping, although the number of time the bridges are lifted is different due to the different rail shunting movement patterns over the two crossings. An assessment of the variation in the occurrence of events over the average day showed that most of the potential delay to road traffic movements takes place overnight, overnight, in the morning between 1000 and 1200, in the afternoon between 1400-1500, and in the evening between 1700-1900.

Analysis of the data shows also that, in most cases, the two bridges are not operated at the same time when shipping is approaching, though some tight time intervals exists (5-10 minutes). Thus, it is likely that with this pairing arrangement, under usual operating conditions, disruption to road traffic is minimised as an alternative route is available for road traffic.

Assuming a continuous operating time horizon of 120 hours (5 days, 24 hours) for both bridges, road traffic cannot access the Oosterweelbrug crossing for 17% of the time and Wilmarsdonkbrug for 11%. This difference can be explained analysing the incidence of train shunting on the Oosterweelbrug, where they account for nearly 65% of the total movements recorded over 5 weekdays, more than double of the rail movements occurred on the Wilmarsdonkbrug (35%). On the contrary, the total number of incidences of road traffic disruption for bridge lifting is much more comparable, being in the region of 55 events recorded throughout the survey period.

The average delay is around 8 minutes for Oosterweelbrug and 10 minutes for Wilmarsdonkbrug. The maximum delay recorded is, respectively, 23 and 28 minutes.

1.3.2. Noordkasteelbruggen crossings

Noordkasteelbruggen crossing consists of two parallel lifting bridges both for road and rail traffic, one for each direction of traffic. They are operated simultaneously to allow vessels to enter Amerikadok and Vijfde Havendok areas.

An analysis of road traffic-stopping event duration by time of day showed that Noordkasteelbruggen shows a similar pattern of bridge lifting to the Oosterweelbrug and Wilmarsdonkbrug crossings.

It is estimated that traffic is prevented from using the crossing during lifting manoeuvres for 19% of the day total operating time. The total recorded movements are equally divided between rail shunting and bridge lifting events. The average duration of a disruption to traffic is 9 minutes, with an absolute maximum recorded peak of 24 minutes.

The following Table 3.1 shows the frequency of road traffic disruption events due to either bridge lift or train movements, by time period and duration. Average number of events were also calculated on a 5 consecutive days basis (daily average), as well as for each weekday time period (time period average). As can be seen the disruptions are potentially significant with port road traffic disrupted on average once an hour by time period increasing to twice an hour in the evening peak period.

Table 3.1: Frequency of road traffic-disruption events at Noordkasteelbruggen by time period and duration (5 Consecutive Weekdays in November 2007)

Time Interval	Duration [minutes]					
	<5	5-10	11-20	>20	Total [events]	Average [events/hour]
00:00-06:59	2	19	10	1	**32**	**5**
07:00-09:59	0	19	2	0	**21**	**7**
10:00-13:59	0	24	3	0	**27**	**7**
14:00-15:59	6	3	3	1	**13**	**7**
16:00-19:59	0	22	10	0	**32**	**8**
20:00-23:59	1	11	4	0	**16**	**4**
					141	

Source: Port of Antwerp

* Average values are rounded

1.3.3. Siberiabruggen crossings

Similarly to Noordkasteelbruggen, Siberiabruggen consists of two lifting bridges for road traffic only, one for each direction of traffic, allowing shipping to enter or leave Kattendijkdok area. It is located on the strategic route that links Groenendaallaan to Oosterweelsteenweg and Scheldalaan roads.Table 3.2:presents the road traffic-disruption events surveyed at this lifting bridge.

Table 3.2: Frequency of road traffic-disruption events at Siberiabruggen by time period and duration (November 2007)

Time Interval	Duration [minutes]						
	<5	5-10	11-20	>20	Total [events]	Average [events/hour]	Time Period Average [events/day/hour]
00:00-06:59	0	9	0	0	**9**	**2**	**<1**
07:00-09:59	0	13	1	0	**14**	**3**	**1**
10:00-13:59	1	10	0	0	**11**	**2**	**1**
14:00-15:59	0	9	0	0	**9**	**2**	**1**
16:00-19:59	0	14	1	0	**15**	**3**	**1**
20:00-23:59	0	3	0	0	**3**	**1**	**1**
Total	1	58	2	0	**61**		**<1**

Source: Port of Antwerp

* Average values are rounded

The distribution pattern is quite similar to the other lifting bridges with a concentration of weekly lifting manoeuvres taking place between 1000 and 1500, and between 1800 and 2000.

In November, the average weekday duration time recorded is 7 minutes, with a maximum duration of 11 minutes.

Over a weekly (Monday-Friday) time horizon, the bridges were unavailable to traffic for 6% of the 5-day week operating time.

1.3.4. Summary

In this section, data provided by the Antwerp Port Authority on lifting bridge operations on the Oosterweelsteenweg port access route was analysed to understand the operational patterns and their impact on the road traffic movements in the Inner Right Bank port area. The bridges analysed were Oosterweelbrug, Wilmarsdonkbrug, Noordkaastelbruggen and Siberiabruggen. The data provided a record of all the road traffic-disrupting events taking place at these bridges for either bridge lifting or freight train shunting. The data analysed was for 5 consecutive weekdays (Monday to Friday) in November 2007.

The main conclusions from this analysis can be summarised, as follows:

- The Noordkaastelbruggen is the lifting bridge which provides the greatest disruption to road traffic with the bridge being unavailable to road traffic for 19% of the total operating time (120 hours over 5 continuous weekdays);
- on average, Noordkasteelbruggen is not accessible by road traffic 1 time per hour, with

a peak of 2 closures per hour between 1600 and 2000 (see Table 3.1);
- the relatively high percentage of disruption to road traffic found at Oosterweelbrug, Wilmarsdonkbrug, Noordkaastelbruggen reflects both lifting of the bridges and train shunting movements at these crossings (accounting for between 35% and 65% of the total recorded events);
- Oosterweelbrug and Wilmarsdonkbrug bridges are not lifted simultaneously, but a time interval exists between the lifting of the two bridges so that an alternative route for road traffic is available when one of the bridges is not accessible (see Figure 3.1);
- on average, at Siberiabruggen there is 1 closure per hour as a result of bridge lifting operations between 0700 and 2000 (see Table 3.2).

1.4 FUTURE PORT DEVELOPMENT AND GROWTH

1.4.1. Development Plans and Modal Split Targets

The Port of Antwerp is the second largest in Europe after Rotterdam and the fourth largest in the world. The Port of Antwerp has some distinguishing features which have driven growth in cargo demand. These are, as follows:

- The Port's central position in northwest Europe which gives the Port good connections to important centres of industries and trade;
- The Port provides the largest amount of space in northwest Europe within the port area to store, sort and distribute goods to their final destinations, hence Antwerp is one of the most important consolidation and logistic centres in Europe;
- The Port has a large capacity to carry goods as far as 80km inland by sustainable modes of transport; and
- Goods can be distributed by multiple modes namely road, rail, barge and through an extensive pipeline system between sectors within the port.

Due to these features there has been rapid growth in throughput over the past 10-15 years (particularly in container traffic). The Port of Antwerp recognises that transport links are a key factor in the future growth of the port. Therefore a number of multimodal transport projects planned for the area, of which some key projects are:

- Construction of the Liefkenshoek rail tunnel providing a second rail crossing between the Left and Right Banks of the Schelde in the port area;
- Upgrading the Royers and Van Cauwelaert locks for barge traffic; and
- The Oosterweel link between the left and right banks of the Scheldt which will improve through (transit) traffic movements and traffic access to/from Antwerp.

A high proportion of container traffic currently uses the road system. The Port aims to reduce the road modal share for container traffic to 50% of the total. The Liefkenshoek Rail Tunnel is being built to assist with these targets, however, road is a more convenient mode than rail for short trips and many of the container trips to/from the Port are relatively short-distance. Therefore, in many instances transport by road will continue to be an important mode of transport to/from the port and therefore accessibility to the highway network is of key importance.

A key objective of the strategic plan for the Port of Antwerp is developing the Left and Right Banks of the Schelde as independent port facilities (i.e. a single, functionally integrated system with multiple uses), and hence reducing the demand for transport links across the Schelde.

In terms of expansion plans, Deurganck Dock will provide additional capacity for containers, but on trend growth it is estimated that more capacity will be needed by

around 2020. Therefore, further expansion is planned at Safetinghe Dock (north of Deurganck Dock on the Left Bank) which is expected to double container capacity. Safetinghe Dock is in the Plan B1 Variant for the proposed development of the Port. However, Plan B1 has not yet been formally approved and there is likely to be opposition from residents on the Left Bank.

1.4.2. Modal Split

Currently, the modal split for Port of Antwerp maritime freight is, as follows:

- 32% by barge transport;
- 31% by road transport;
- 21% by pipelines;
- 12% by rail; and
- 4% by seagoing ship.

The forecast modal split for Plan B1 Variant for each cargo type is shown in Table 4.1.

Table 4.1: Plan B1 Variant Modal Split

Good Type	Water	Rail	Road	All Modes
Containers	42%	15%	43%	100%
Other Goods	44%	26%	30%	100%
Industry	20%	10%	70%	100%

Source: MER Study

1.4.3. Forecast Growth with the Port

The Port of Antwerp has produced cargo growth forecasts for the period up to 2020 which are presented in the MER study. These forecasts represent alternative scenarios for meeting the Port of Antwerp's aspirations for the future development of the port. Table 4.2 shows the base 2003 and cargo growth forecasts (in tonnes per year) for 2030 Plan B1 Variant, whilst Table 4.3 shows the absolute growth and compound annual growth rate (CAGR) between 2003 and 2030. The Plan B1 Variant forecasts show a large planned increase in cargo on the Left Bank.

Corresponding growth forecast and CAGR for the Nulvariante low and high growth forecasts are presented in Tables 4.4 to 4.7. These show an overall CAGR (2003-2030) of 3.1% for B1 Variant, 1.8% for Nulvariante low growth forecast and 2.2% for Nulvariante high growth. The Nulvariante low growth scenario total tonnage forecast is some 30% lower than the Plan B1 Variant and the Nulvariante high growth scenario is some 20% lower than Plan B1 Variant. The lower forecasts are attributable to much lower forecast growth in the Left Bank Outer Port, particularly in the forecast growth in container business.

Table 4.2: Cargo Growth (Tonnage) 2003 to 2030 - Plan B1 Variant ForecastTable 4.2 Cargo Growth (Tonnage) 2003 to 2030 - Plan B1 Variant Forecast

Area	Tonnes per Year (in 000s)									
	2003					2030 Plan B1 Variant				
	Container	Other non-industrial goods	Industry	Share via Logistics	Total	Container	Other non-industrial goods	Industry	Share via Logistics	Total
Right Bank Inner Port	7.148	32.655	22.847	192	**62.841**	5.854	33.289	39.455	731	**79.328**
Right Bank Outer Port	41.834	26.843	11.565	1.125	**81.367**	51.883	27.364	19.972	6.475	**105.694**
Left Bank Inner Port	0	0	573	0	**573**	0	1.333	18.070	0	**19.403**
Left Bank Outer Port	2.391	9.825	1.187	64	**13.467**	107.409	17.277	18.084	13.405	**156.175**
Total	**51.373**	**69.323**	**36.171**	**1.382**	**158.248**	**165.146**	**79.263**	**95.581**	**20.610**	**360.600**

(Source: MER Study)

Table 4.3 Absolute Growth and CAGR between 2003 and 2030 - Plan B1 Variant Forecast

Port Area	Absolute Growth in Tonnes between 2003 to 2030 (Plan B1 Variant)					CAGR %				
	Container	Other non-industrial goods	Industry	Logistics	Total	Container	Other non-industrial goods	Industry	Logistics	Total
Right Bank Inner Port	-1.294	634	16.608	538	**16.486**	-0,7%	0,1%	2,0%	5,1%	**0,9%**
Right Bank Outer Port	10.049	521	8.407	5.350	**24.327**	0,8%	0,1%	2,0%	6,7%	**1,0%**
Left Bank Inner Port	0	1.333	17.497	0	**18.830**			13,6%		**13,9%**
Left Bank Outer Port	105.018	7.452	16.897	13.340	**142.708**	15,1%	2,1%	10,6%	21,9%	**9,5%**
Total	113.773	9.940	59.410	19.228	202.351	4,4%	0,5%	3,7%	10,5%	3,1%

(Source: MER Study)

Table 4.4 Cargo Growth (Tonnage) 2003 to 2030 - Nulvariante Low Growth Forecast

Area	Tonnes per Year (in 000s)									
	2003					2030 Nulvariante Low Growth				
	Container	Other non-industrial goods	Industry	Logistics	Total	Container	Other non-industrial goods	Industry	Logistics	Total
Right Bank Inner Port	7.148	32.655	22.847	192	**62.841**	7.197	28.561	34.680	898	**71.336**
Right Bank Outer Port	41.834	26.843	11.565	1.125	**81.367**	50.646	23.477	17.555	6.321	**97.999**
Left Bank Inner Port	0	0	573	0	**573**	0	0	12.239	0	**12.239**
Left Bank Outer Port	2.391	9.825	1.187	64	**13.467**	47.644	8.593	9.915	5.946	**72.098**
Total	**51.373**	**69.323**	**36.171**	**1.382**	**158.248**	**105.488**	**60.631**	**74.389**	**13.165**	**253.672**

(Source: MER Study)

Table 4.5 Absolute Growth and CAGR between 2003 and 2030 - Nulvariante Low Growth Forecast

Port Area	**Absolute Growth in Tonnes (000s) between 2003 to 2030 (*Nulvariante* Low Growth)**					**CAGR %**				
	Container	**Other non-industrial goods**	**Industry**	**Logistics**	**Total**	**Container**	**Other non-industrial goods**	**Industry**	**Logistics**	**Total**
Right Bank Inner Port	50	-4.094	11.833	706	**8.494**	0,0%	-0,5%	1,6%	5,9%	**0,5%**
Right Bank Outer Port	8.813	-3.366	5.990	5.195	**16.632**	0,7%	-0,5%	1,6%	6,6%	**0,7%**
Left Bank Inner Port	0	0	11.667	0	**11.667**	-	-	12,0%	-	**12,0%**
Left Bank Outer Port	45.253	-1.232	8.728	5.882	**58.630**	11,7%	-0,5%	8,2%	18,3%	**6,4%**
Total	**54.115**	**-8.692**	**38.218**	**11.783**	**95.424**	**2,7%**	**-0,5%**	**2,7%**	**8,7%**	**1,8%**

(Source: MER Study)

Table 4.6 Cargo Growth (Tonnage) 2003 to 2030 - Nulvariante *High Growth Forecast*

Area	**Tonnes per Year (in 000s)**									
	2003					**2030 Nulvariante High Growth**				
	Container	**Other non-industrial goods**	**Industry**	**Logistics**	**Total**	**Container**	**Other non-industrial goods**	**Industry**	**Logistics**	**Total**
Right Bank Inner Port	7.148	32.655	22.847	192	**62.841**	7.197	33.289	39.455	898	**80.839**
Right Bank Outer Port	41.834	26.843	11.565	1.125	**81.367**	50.646	27.364	19.972	6.321	**104.303**
Left Bank Inner Port	0	0	573	0	**573**	0	2.278	14.036	0	**16.315**
Left Bank Outer Port	2.391	9.825	1.187	64	**13.467**	47.644	16.323	11.171	5.946	**81.084**
Total	**51.373**	**69.323**	**36.171**	**1.382**	**158.248**	**105.488**	**79.254**	**84.634**	**13.165**	**282.541**

(Source: MER Study)

Table 4.7 Absolute Growth and CAGR between 2003 and 2030 - Nulvariante *High Growth Forecast*

Port Area	**Absolute Growth in Tonnes (000s) between 2003 to 2030 (*Nulvariante* High Growth)**					**CAGR %**				
	Container	**Other non-industrial goods**	**Industry**	**Logistics**	**Total**	**Container**	**Other non-industrial goods**	**Industry**	**Logistics**	**Total**
Right Bank Inner Port	50	634	16.608	706	**17.997**	0,0%	0,1%	2,0%	5,9%	**0,9%**
Right Bank Outer Port	8.813	521	8.407	5.195	**22.936**	0,7%	0,1%	2,0%	6,6%	**0,9%**
Left Bank Inner Port	0	2.278	13.464	0	**15.742**	#DIV/0!	#DIV/0!	12,6%	#DIV/0!	**13,2%**
Left Bank Outer Port	45.253	6.498	9.985	5.882	**67.617**	11,7%	1,9%	8,7%	18,3%	**6,9%**
Total	**54.115**	**9.931**	**48.463**	**11.783**	**124.292**	**2,7%**	**0,5%**	**3,2%**	**8,7%**	**2,2%**

(Source: MER Study)

A10
CONSTRUCTION ASSUMPTIONS AND AREAS

4. CONSTRUCTION ASSUMPTIONS AND AREAS

The following document describes the methods of construction and corresponding activities and plant assumptions for the 4th Route Option and Refined 4th Option, as used in the environmental evaluation. It is based on the assumptions made elsewhere in this report, and in particular in the section covering the constructability of the schemes.

Construction Activities

Antwerp South West:

Construction works to the south west of the Schelde are the same for the options, and will involve:

- Piling;
- Large scale excavation;
- Bridge construction;
- Bridge finishing works, RC concreting / deck installation;
- Road construction works;
- Spoil disposal;
- Dewatering.

The main construction compound for works to the south west is likely to be situated at the Sint-Linkeroever Annabos south of the Schelde tunnel crossing. For the options, the compound is likely to be smaller that that required for BAM, because it does not require the casting basin essential for the immersed tunnel solution. Similarly dredging of the Schelde would not be required for the bored tunnel solution.

4th Route Option

The 4th Route Option is in bored tunnel from Sint Annabos on the Linkeroever to the connection with the A12 and E19 to the north of the port, at Ekeren.

The tunnelling and associated elements of the works can be considered in three sections:

- At grade to below grade tie-in works from surface to bored tunnel at both ends
- Bored tunnel section
- Viaduct interchange grade separation works to connect to the A12

At grade to below grade tie-in works from surface to bored tunnel

The majority of the works will occur underground. However, there will be limited disruption as a result of the at grade to below grade tie-in works in the Ekeren area.

No works would be conducted in the Oosterweel area.

Bored tunnel section

It is assumed that tunnel works will extend (launch from) from the Linkeroever area towards the A12 north of the docks. Due to a close proximity to the port and sea wall, it is envisaged that ground water cut-off structures will be required to form tunnel portals, ensuring works are kept dry for construction purposes.

Technical studies have indicated that tunnels would need to be 15 – 16 m in diameter which represents a large tunnel diameter. Tunnel portals and TBM reception chamber will be required, which will include significant excavation for a cut and cover section.

A working area around the portals will be required of at least 50 x 50 m to store tunnel lining and for spoil removal.

Viaduct interchange grade separation works

Interchange works are considered to be taking place in the open area adjacent to de Oude Landen conservation area. These works will be undertaken on existing interchange works, and as such through traffic on motorways will not be directly affected.

Interchange works will require excavators for foundations, piling equipment and craneage for lifting of structural viaduct components and concrete pumps for in-situ concrete deck works.

Some widening works will also be required to the R1 south east of location F. This is likely to be significantly reduced as compared to the BAM and HV schemes.

Construction Zones

It has been assumed that construction compounds for the 4th Route Option are likely to be required as shown on the accompanying drawings.

Refined 4th Option

The refined 4th Option, in engineering terms at least, is a variation of the 4th Option with the north eastern end of the tunnel portal emerging further west.

The tunnelling and associated elements of the works can be considered in three sections:

- At grade to below grade tie-in works from surface to bored tunnel at both ends
- Bored tunnel section
- Viaduct interchange grade separation works to connect to the A12

At grade to below grade tie-in works from surface to bored tunnel

The majority of the works will occur underground. However, there will be limited disruption as a result of the at grade to below grade tie-in works in the Ekeren area.

No works would be conducted in the Oosterweel area.

Bored tunnel section

It is assumed that tunnel works will extend (launch from) from the Linkeroever area towards the A12 north of the docks. Due to a close proximity to the port and sea wall, it is envisaged that ground water cut-off structures will be required to form tunnel portals, ensuring works are kept dry for construction purposes.

Technical studies have indicated that tunnels would need to be 15 – 16 m in diameter which represents a large tunnel diameter. Tunnel portals and TBM reception chamber will be required, which will include significant excavation for a cut and cover section.

A working area around the portal will be required of at least 50 x 50 m to store tunnel lining and for spoil removal.

Interchange grade separation works

Interchange works are considered to be taking place in the open area adjacent to the west of de Oude Landen conservation area. These works will be undertaken on existing interchange works, and as such through traffic on motorways will not be directly affected.

Interchange works will require excavators for foundations, piling equipment and craneage for lifting of structural viaduct components and concrete pumps for in-situ concrete deck works.

Construction Zones

It has been assumed that construction compounds for the Refined 4th Option are likely to be required as shown on the accompanying figures.

Plant Assumptions:

The following plant assumption relate to the activities described above for both of the Route Options, and have been used as the basis for the environmental evaluation of the construction.

Construction of TBM Reception Chamber

Plant	Number	% on-time
Piling Rig	4	75
Excavators	6	75
Dumpers	5	75
Generators / compressors	5	100
Concrete pumps	2	50
Concrete mixer trucks	10	50
Cranes	4	50

Timescale – 1 year

Operation of TBM Reception Chamber

Plant	Number	% on-time
Excavators	2	75
Dumpers	2	75
Telehandlers	2	50
Road Wagons	2	50
Cranes	4	100
TBM	2	50

Timescale – 2.5 years

Works to existing R1 and A12 roads

Plant	Number	% on-time
Excavator Mounted Breakers	4	50
Excavators	10	75
Planer	1	35
Grader	1	35
Vibratory roller	2	35
Paving machine	1	25
Trucks	5	10
Compressor / Generators	5	100
Dumpers	5	50

Timescale – 1 year for each

Materials Deliveries

Plant	Number	% on-time
Excavators	2	75
Dumpers	2	75
Telehandlers	2	50
Road Wagons	2	50
Cranes	4	50

Timescale – 3.5 years

A11
NOISE TECHNICAL APPENDIX

4. NOISE TECHNICAL APPENDIX

This appendix includes the noise contour mapping prepared from the output of the noise modelling that has been undertaken. The both the 4th Route Option and the Refined 4th Option, contour plans have been prepared to show:

- Absolute noise levels during the day and during the night
- Difference in day time and night time noise levels by comparison to the Do Minimum
- Comparison of day time and night time noise levels differences between the options, and between each option and BAM
- 24 hour Equivalent noise levels used in the calculation of disturbance to noise vulnerable habitat

Key

T2 _____ 4th Route Option

T3 _____ Refined 4th Option

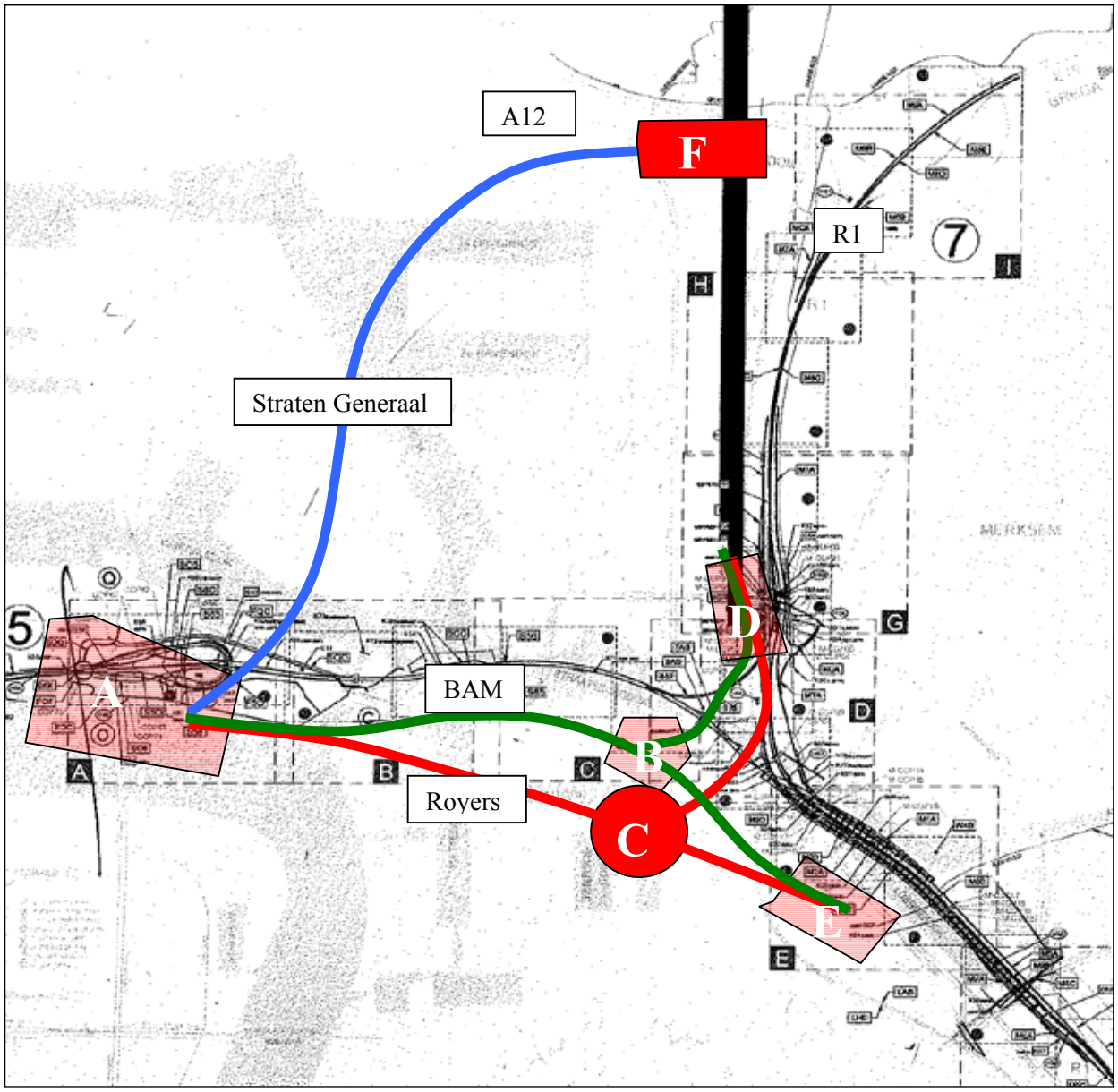
BAM _____ BAM scheme

DM _____ Do Minimum

Lden _____ noise levels during the day

Ln _____ noise levels during the night

Leq,24h _____ average noise levels over a 24 hour period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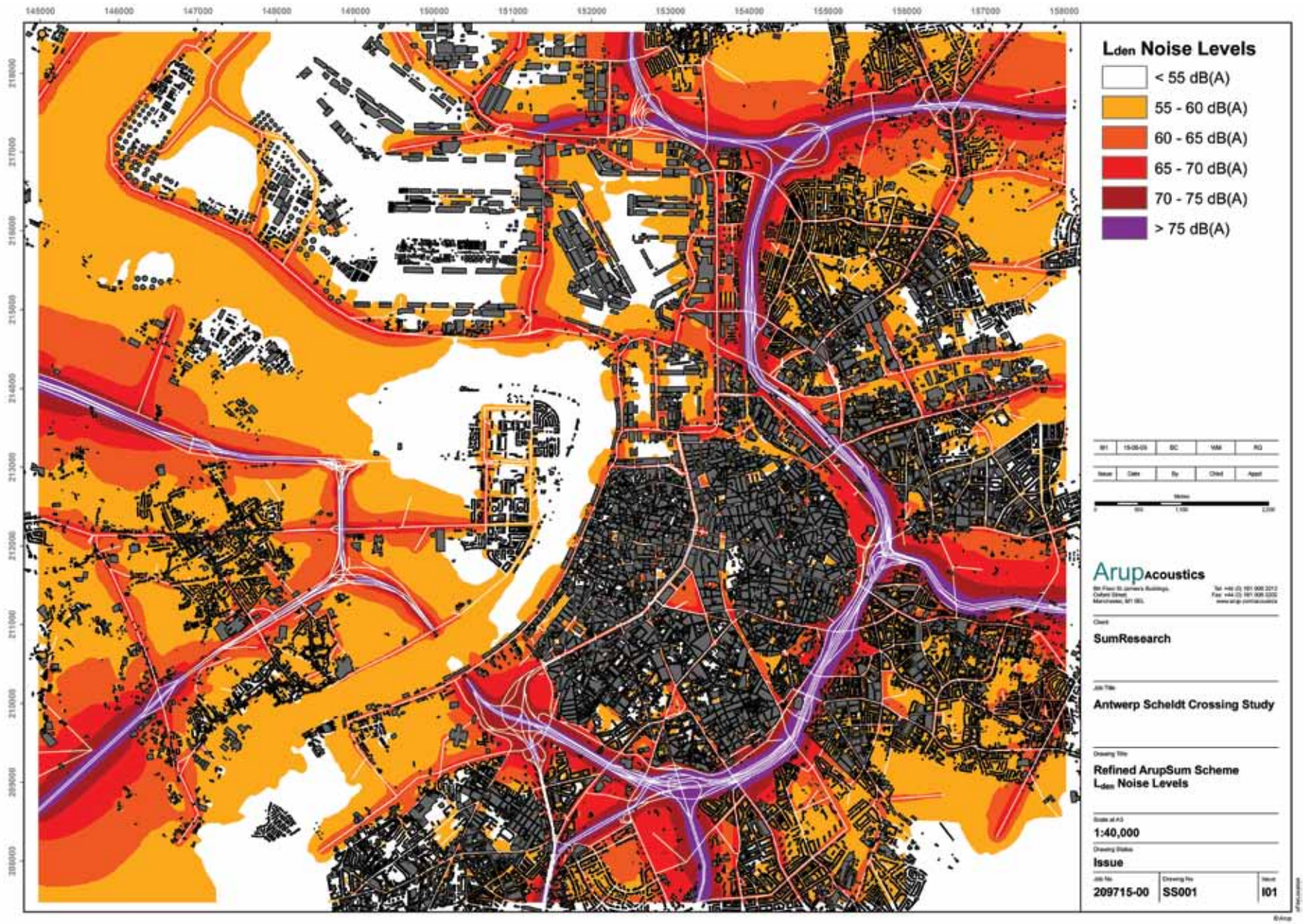
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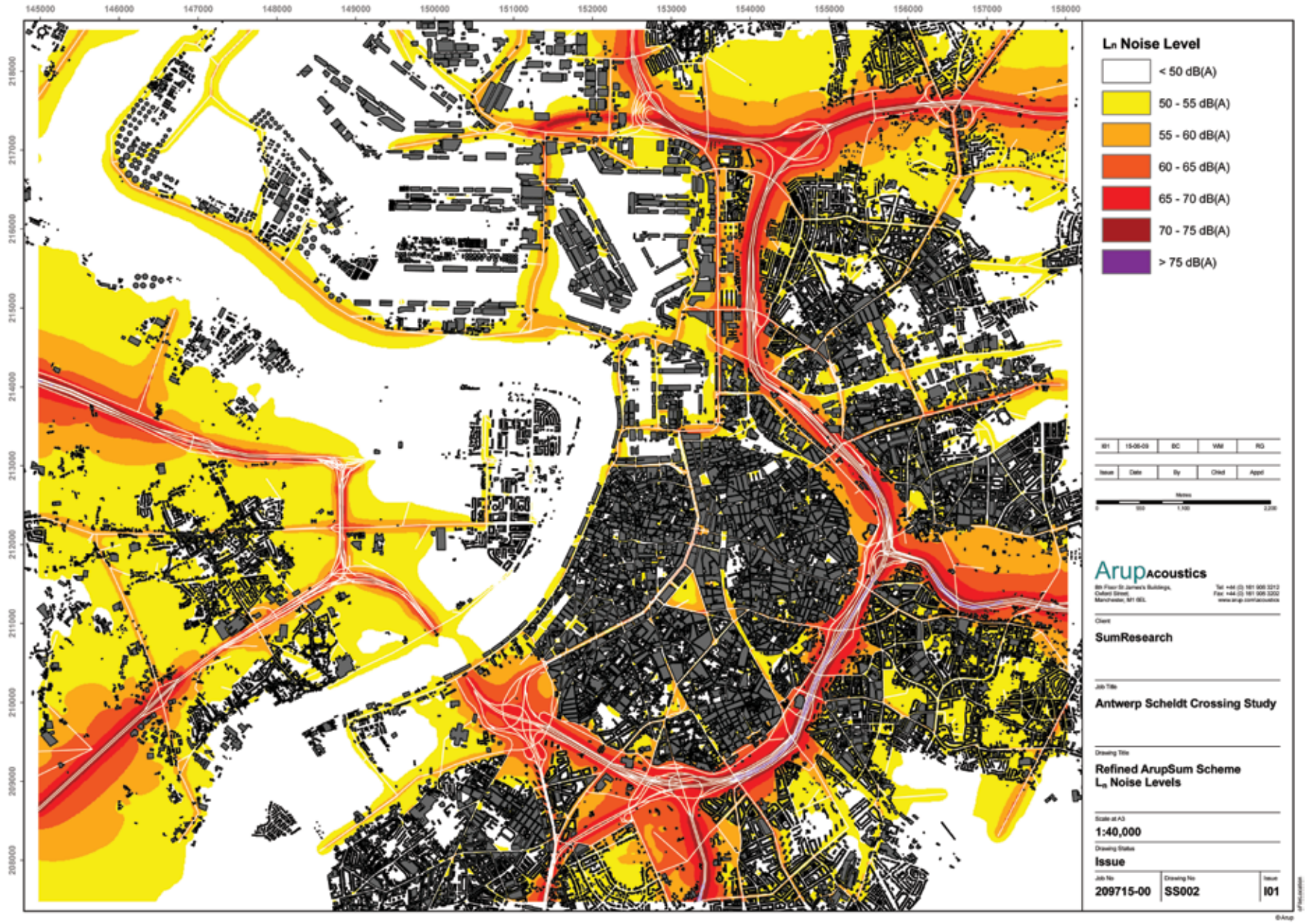
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8th Floor St James's Buildings, Oxford Street, Manchester, M1 6EL
Tel: +44 (0) 161 908 3212
Fax: +44 (0) 161 908 3202
www.arup.com/acoustics
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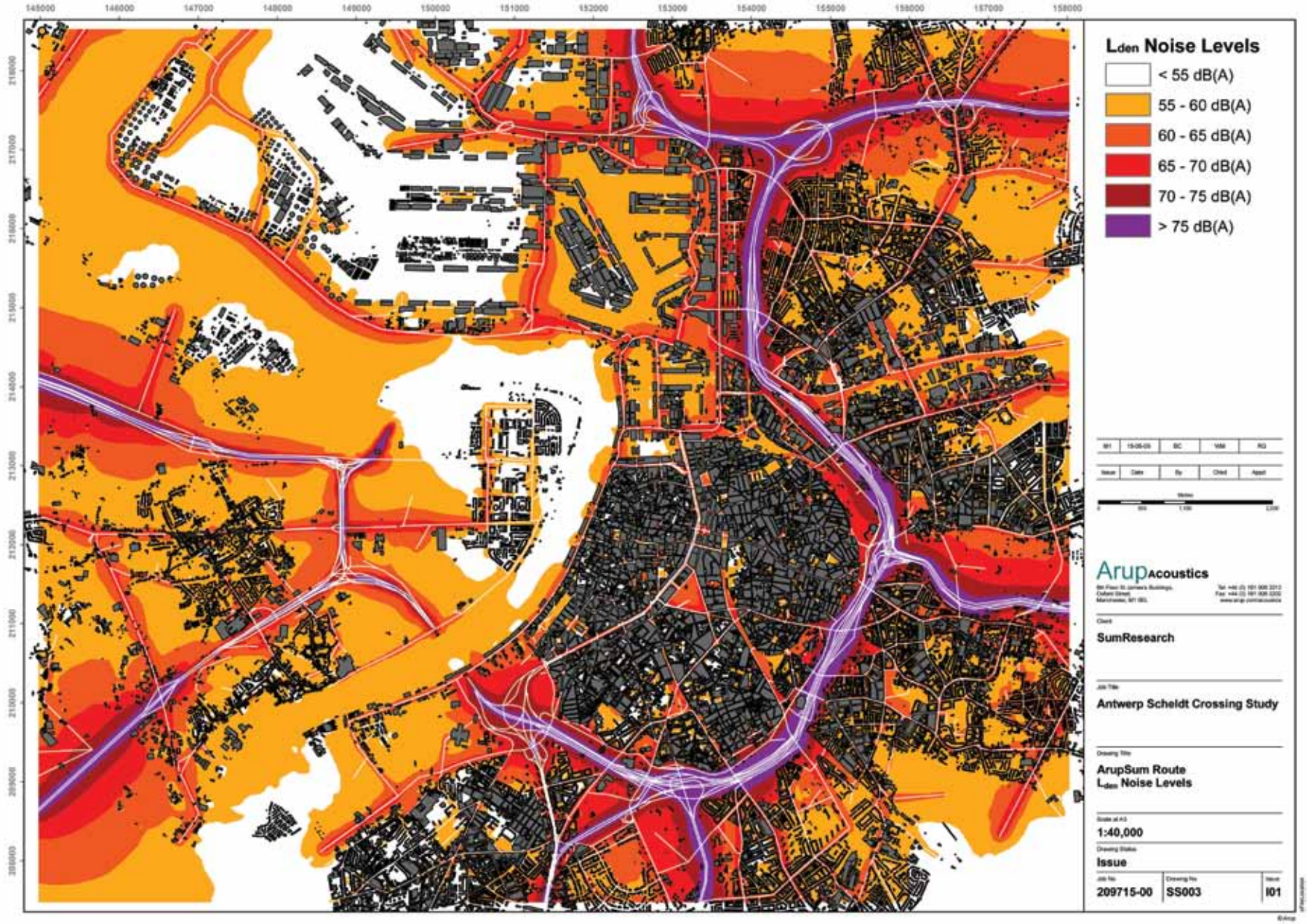
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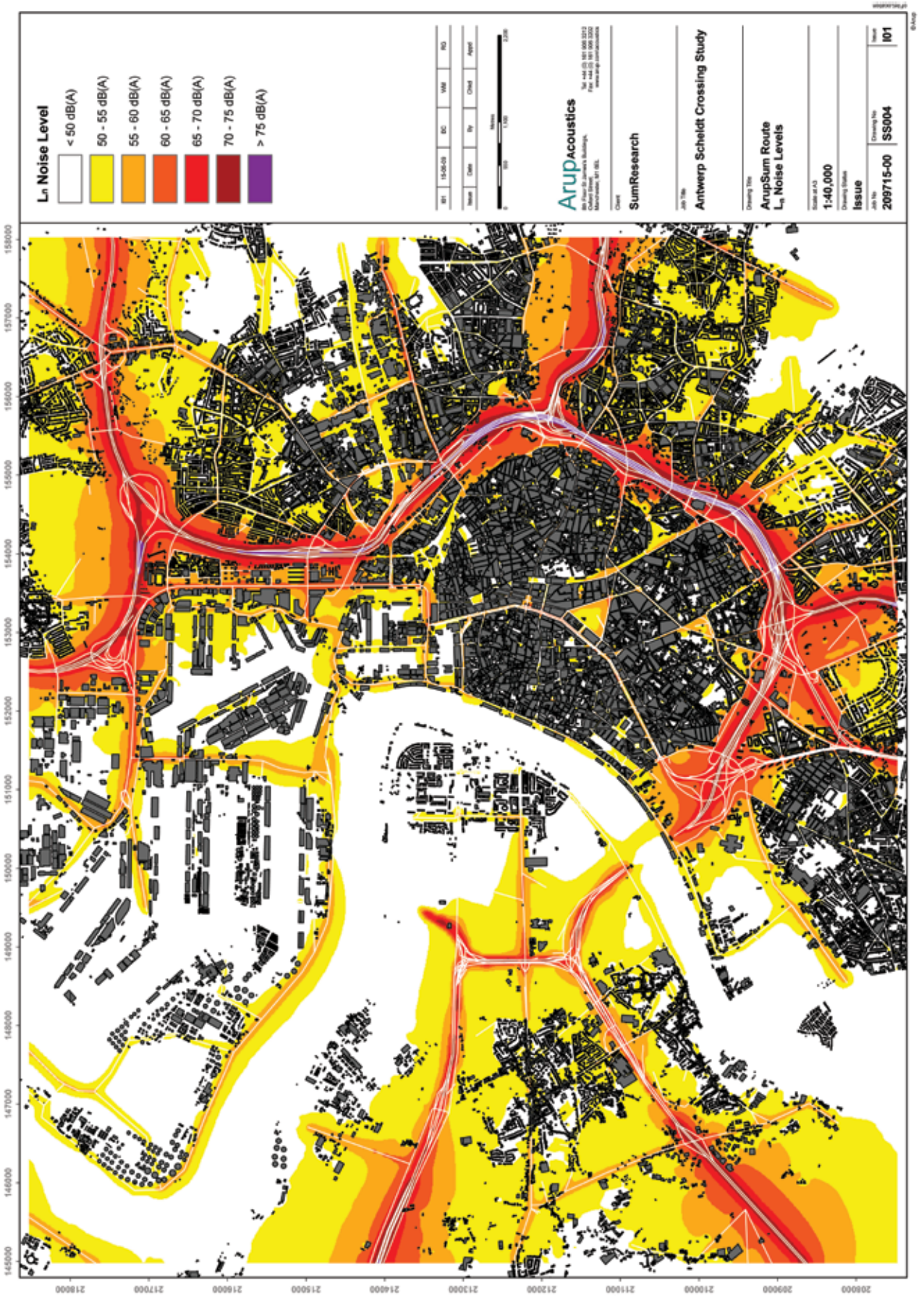
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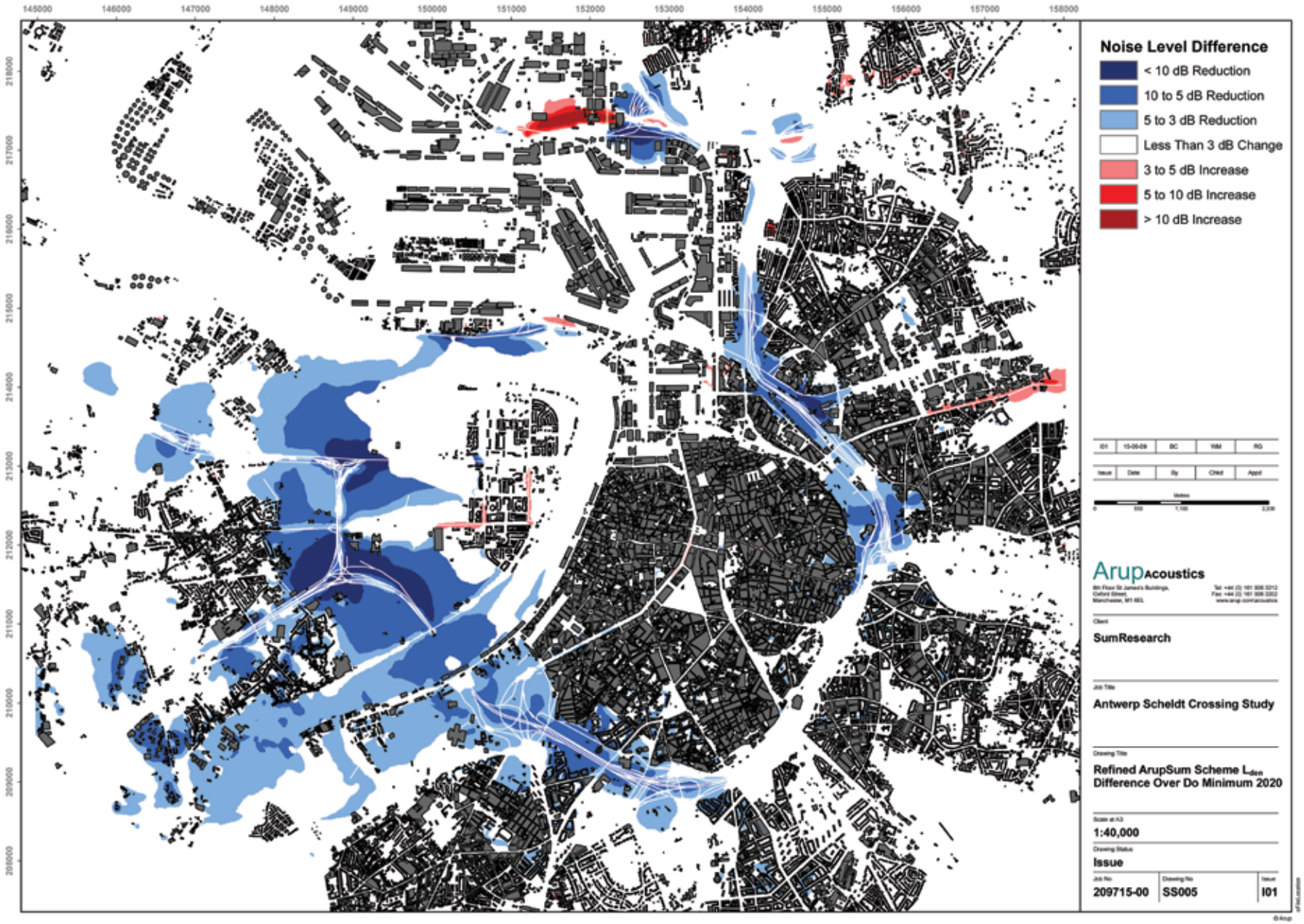
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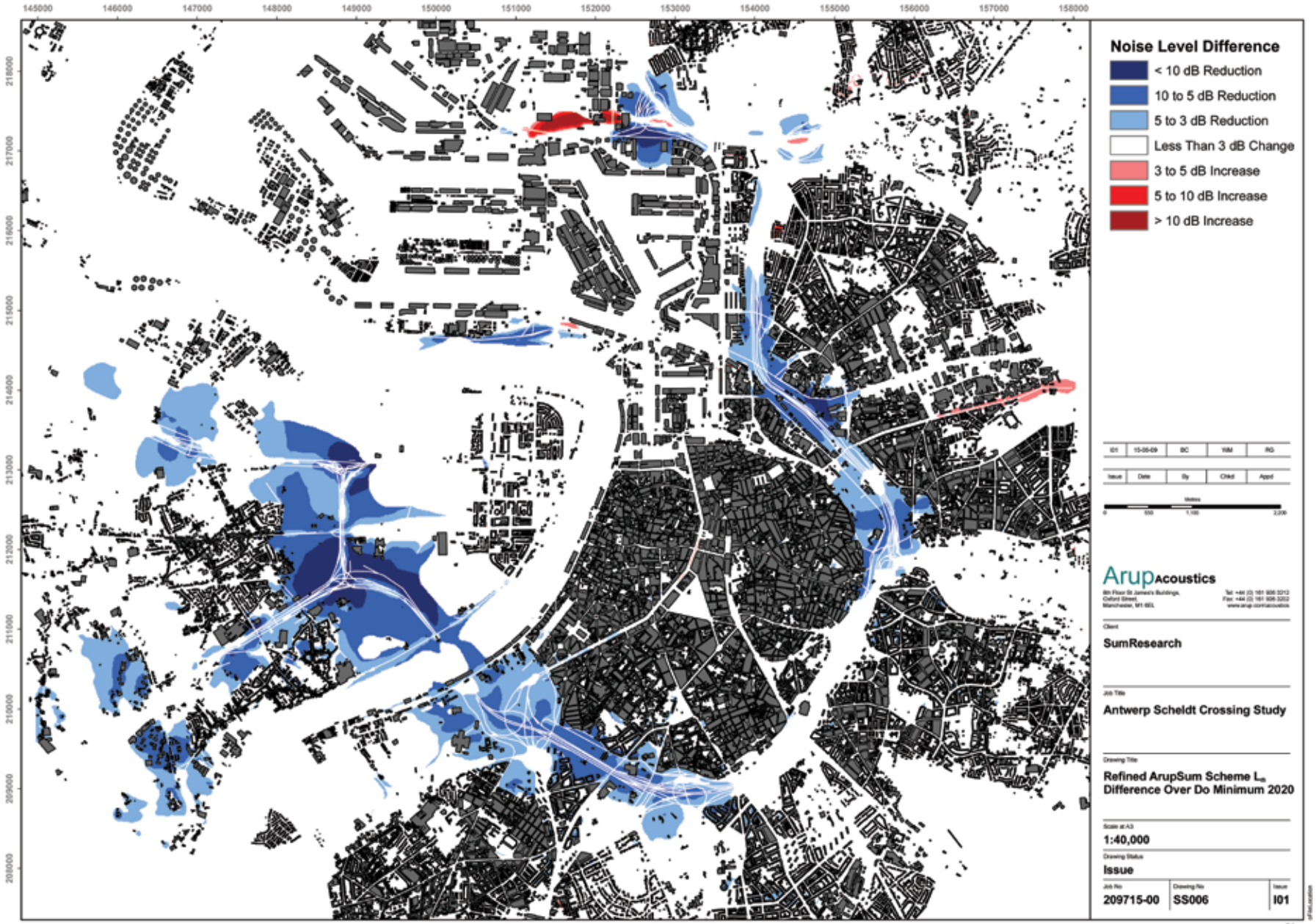
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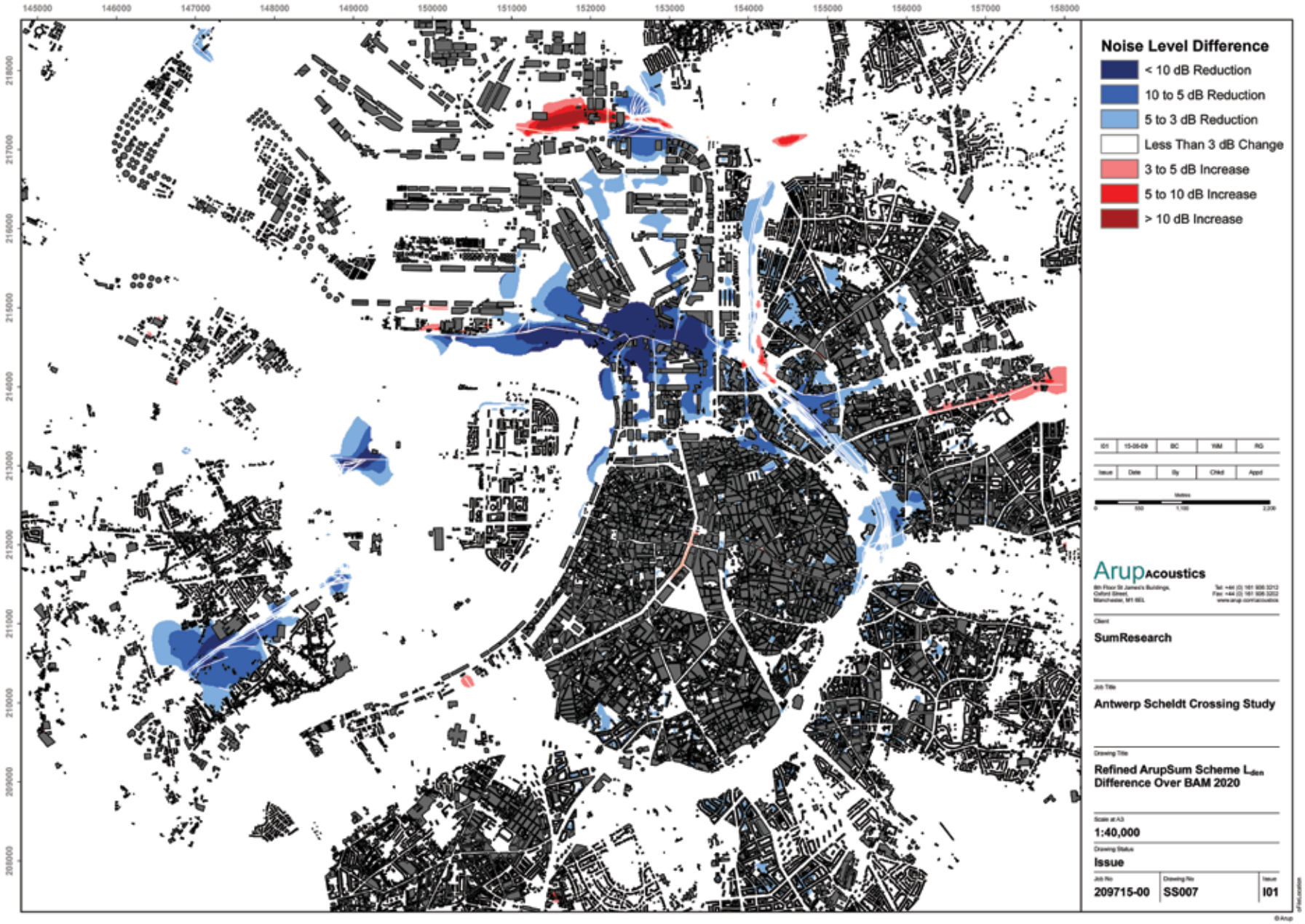
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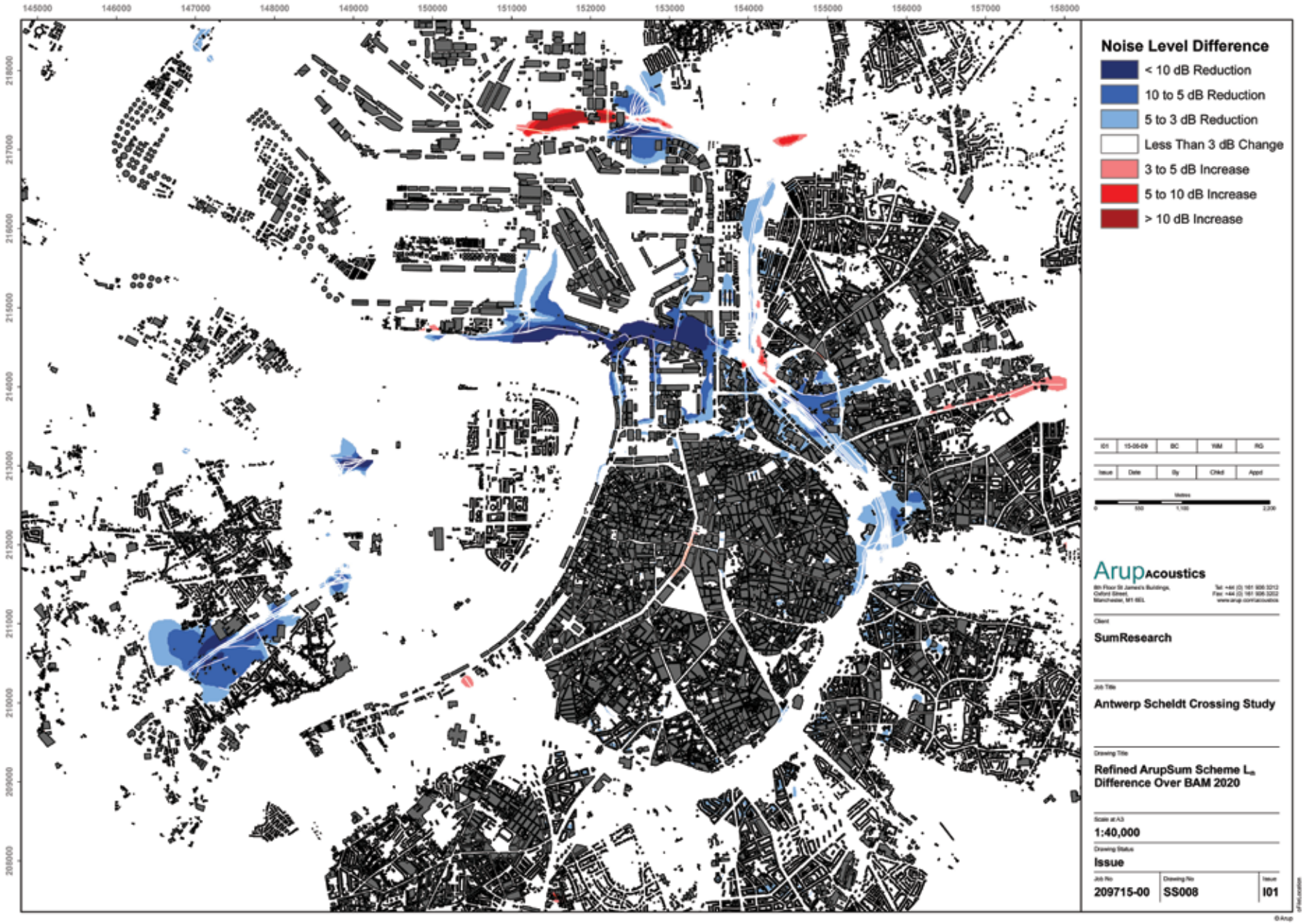
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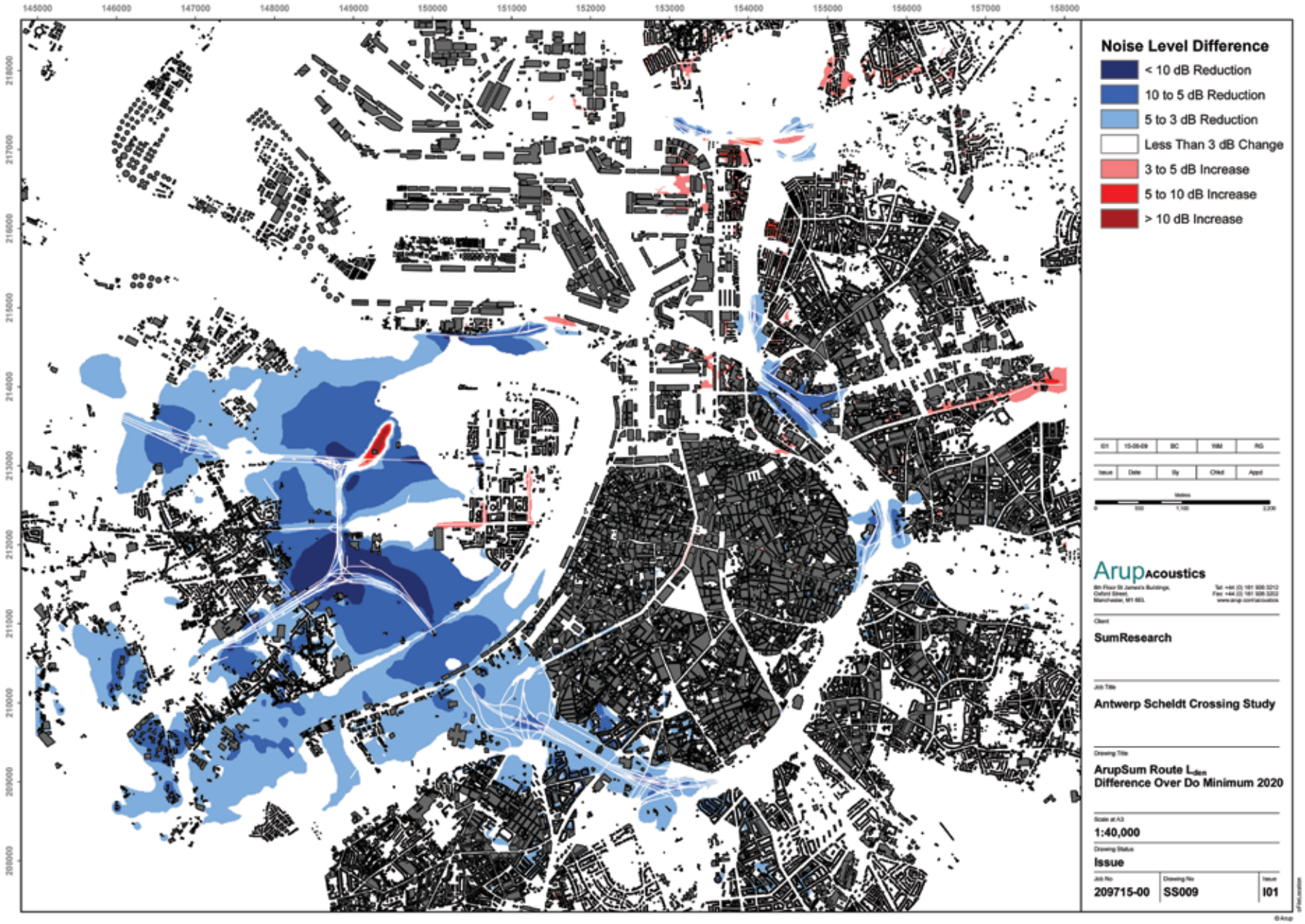
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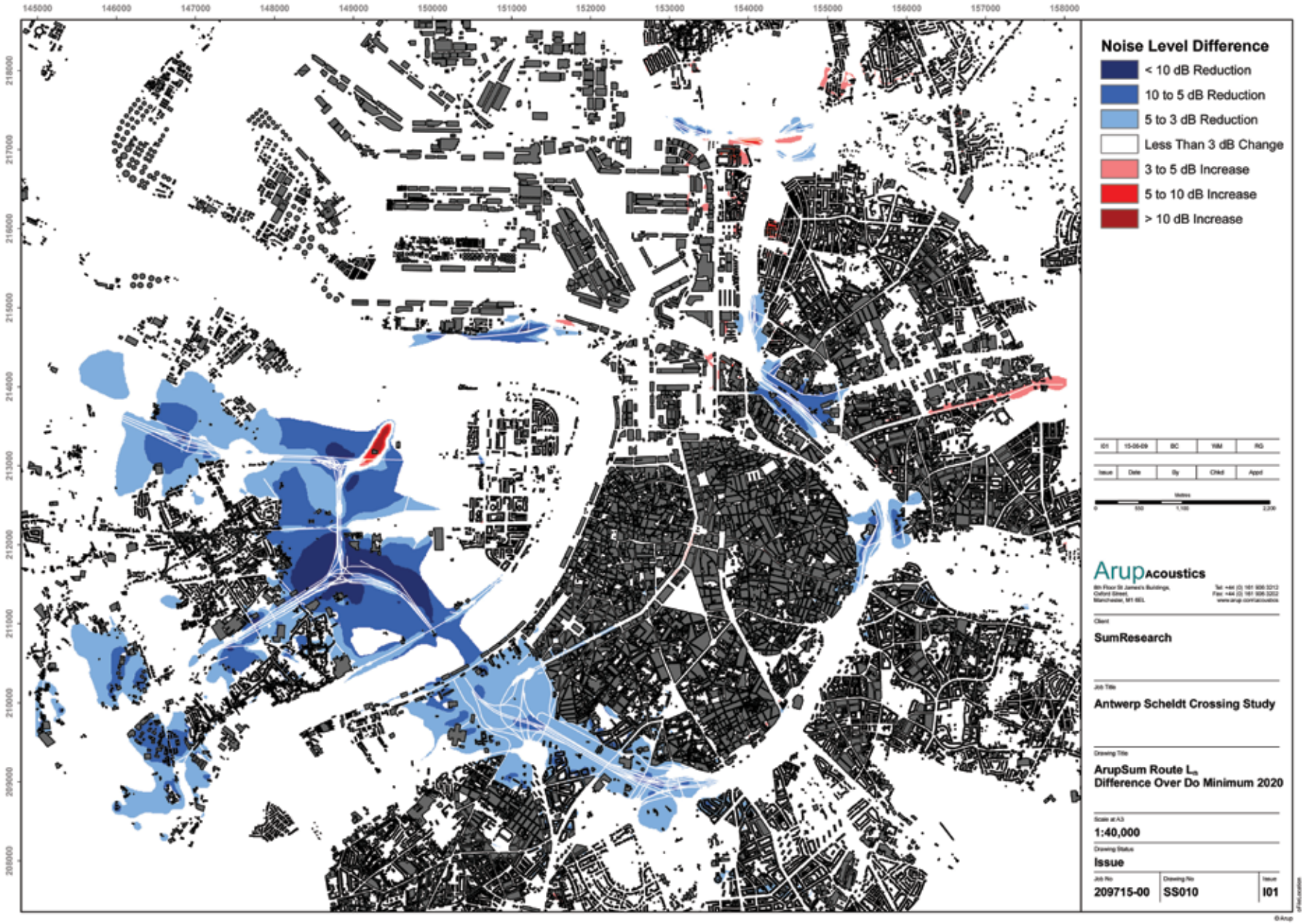
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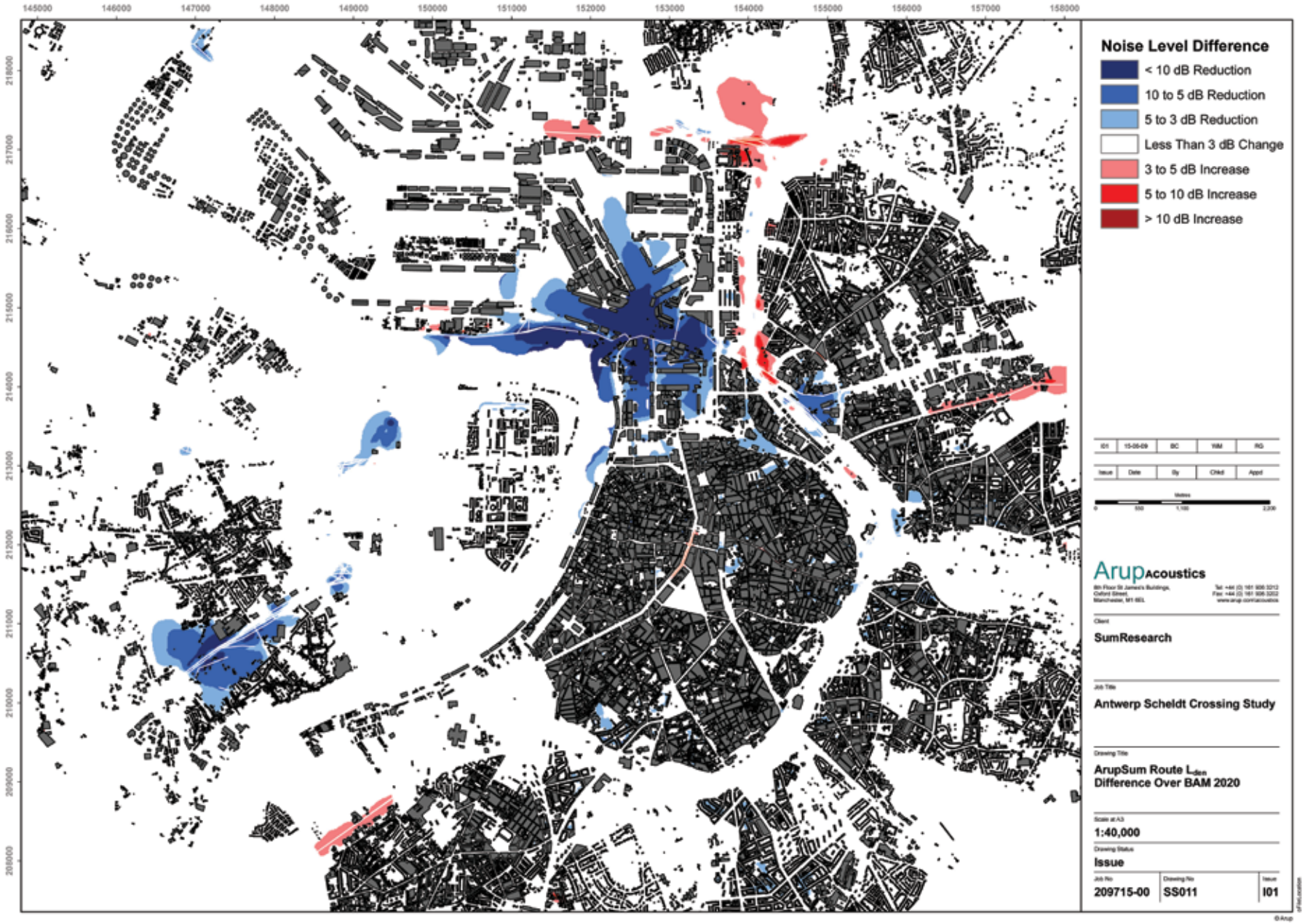
Noise Level Difference
< 10 dB Reduction
10 to 5 dB Reduction
5 to 3 dB Reduction
Less Than 3 dB Change
3 to 5 dB Increase
5 to 10 dB Increase
> 10 dB Increase
Arup Acoustics
SumResearch
Antwerp Scheldt Crossing Study
ArupSum Route L10
Difference Over Do Minimum 2020
1:40,000
Issue
209715-00
SS010
I01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Noise Level Difference
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5 to 3 dB Reduction
Less Than 3 dB Change
3 to 5 dB Increase
5 to 10 dB Increase
> 10 dB Increase
Arup Acoustics
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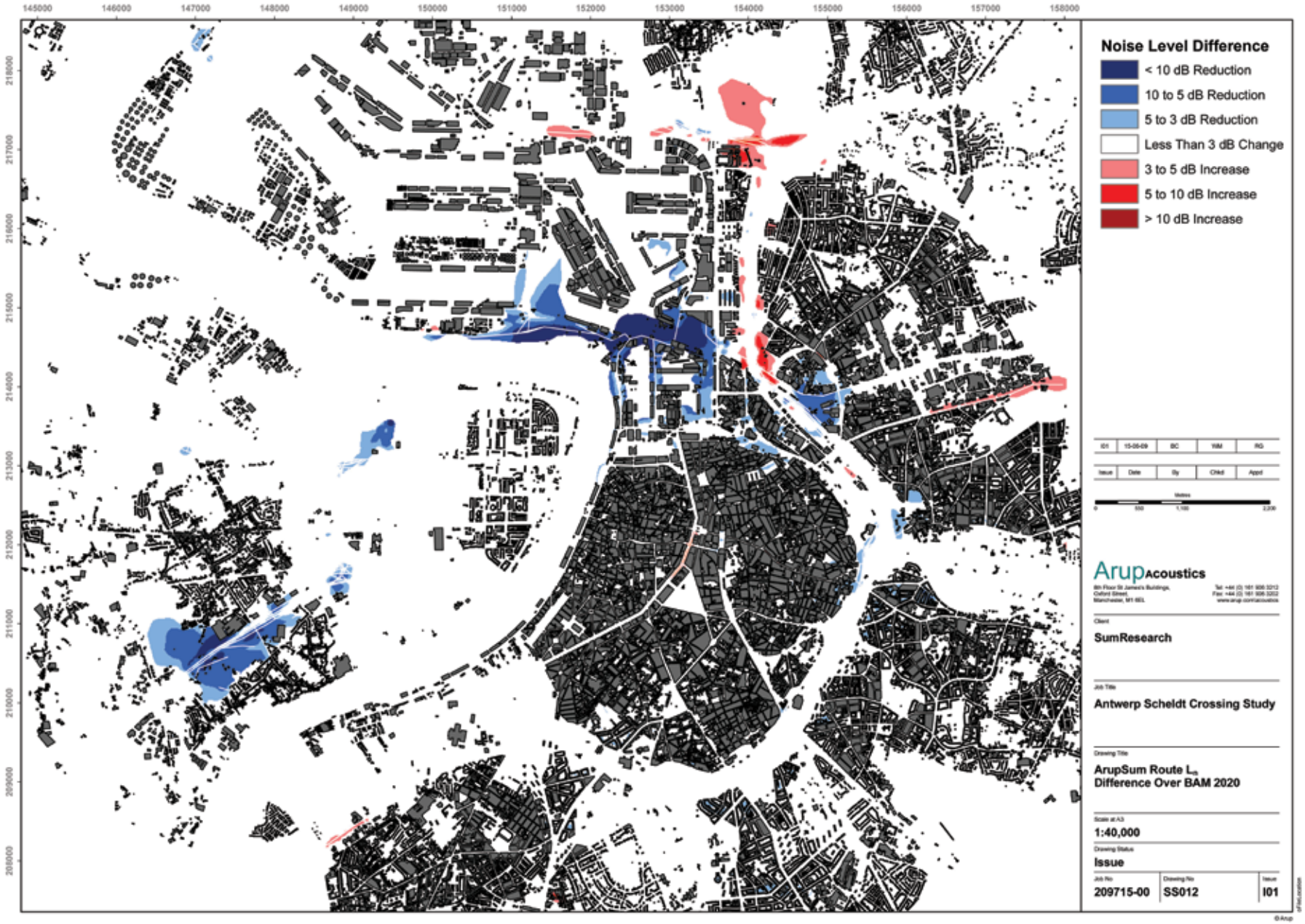
SS011
I01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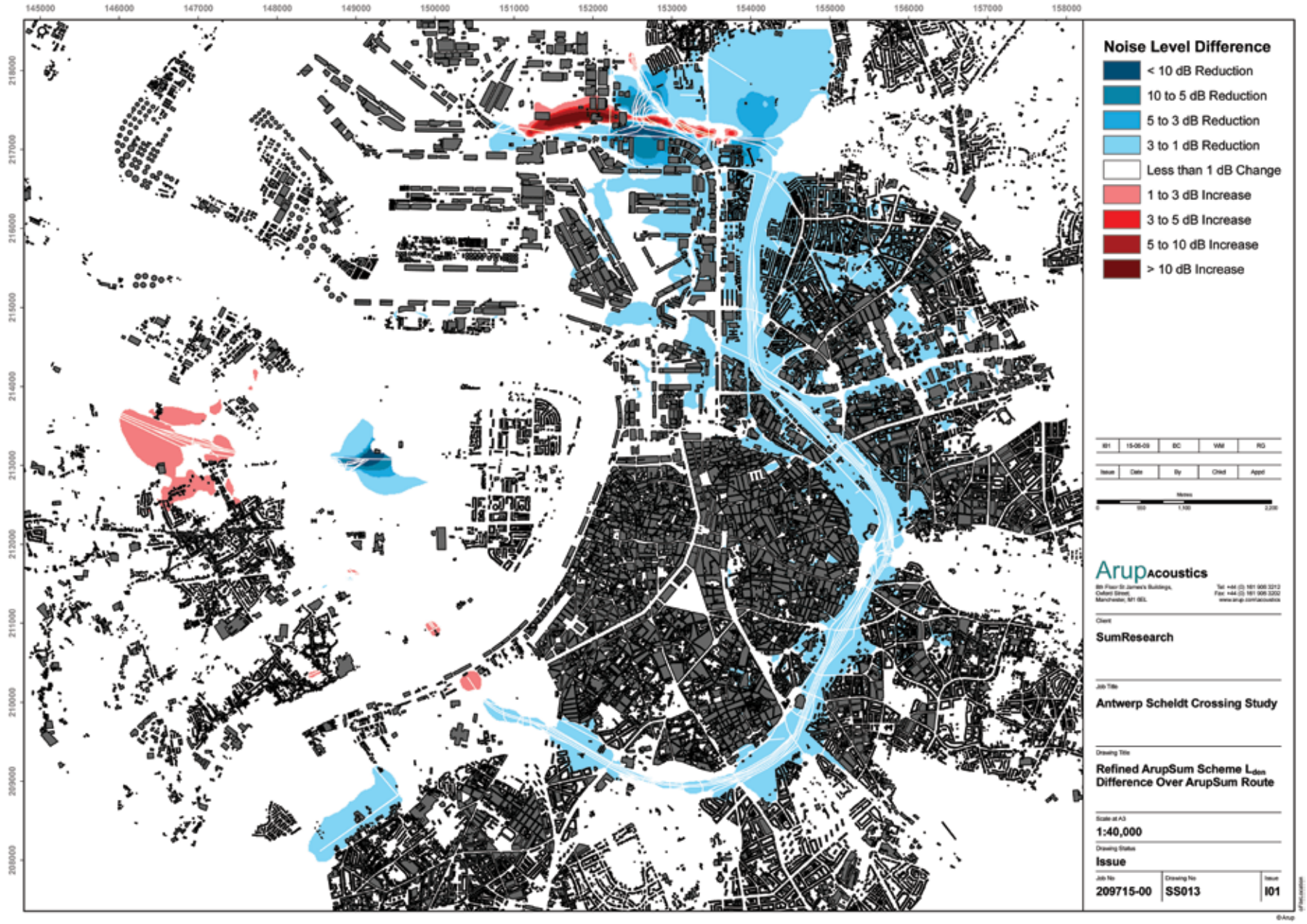
Noise Level Difference
< 10 dB Reduction
10 to 5 dB Reduction
5 to 3 dB Reduction
Less Than 3 dB Change
3 to 5 dB Increase
5 to 10 dB Increase
> 10 dB Increase
I01
15-06-09
BC
NM
RG
Issue
Date
By
Chkd
Appd
Metres
0
550
1,100
2,200
Arup Acoustics
8th Floor St James's Buildings,
Oxford Street,
Manchester, M1 6EL
Tel: +44 (0) 161 906 3212
Fax: +44 (0) 161 906 3202
www.arup.com/acoustics
Client
SumResearch
Job Title
Antwerp Scheldt Crossing Study
Drawing Title
ArupSum Route L_{den}
Difference Over BAM 2020
Scale at A3
1:40,000
Drawing Status
Issue
Job No
209715-00
Drawing No
SS012
Issue
I01
© Arup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Noise Level Difference
< 10 dB Reduction
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5 to 3 dB Reduction
3 to 1 dB Reduction
Less than 1 dB Change
1 to 3 dB Increase
3 to 5 dB Increase
5 to 10 dB Increase
> 10 dB Increase
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BC
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RG
Issue
Date
By
Chkd
Appd
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Arup Acoustics
8th Floor St James's Buildings,
Oxford Street,
Manchester, M1 6EL
Tel: +44 (0) 161 906 3212
Fax: +44 (0) 161 906 3202
www.arup.com/acoustics
Client
SumResearch
Job Title
Antwerp Scheldt Crossing Study
Drawing Title
Refined ArupSum Scheme L_{den}
Difference Over ArupSum Route
Scale at A3
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Drawing No
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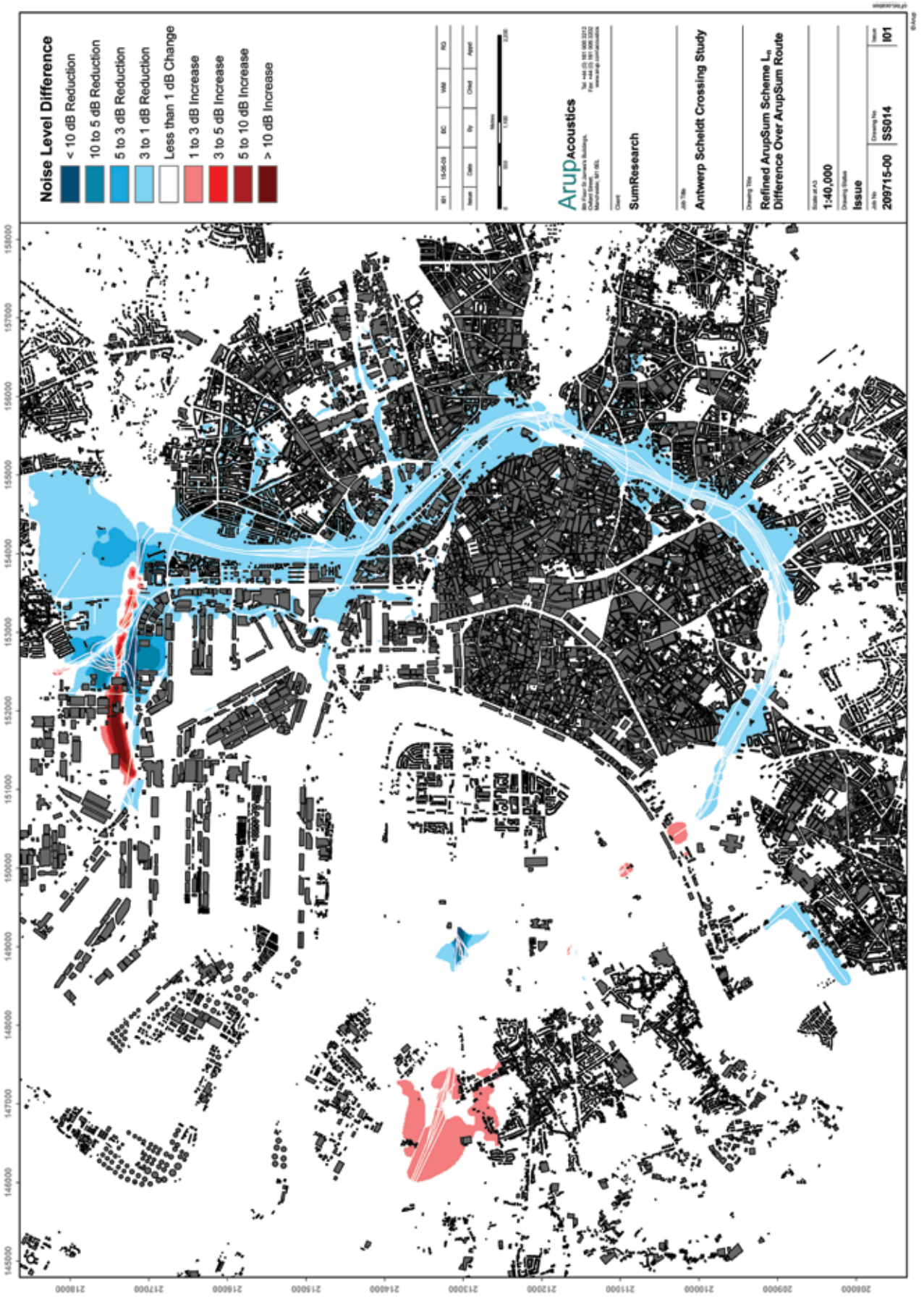
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5 to 3 dB Reduction
3 to 1 dB Reduction
Less than 1 dB Change
1 to 3 dB Increase
3 to 5 dB Increase
5 to 10 dB Increase
> 10 dB Increase
Arup Acoustics
SumResearch
Antwerp Scheldt Crossing Study
Refined ArupSum Scheme L,
Difference Over ArupSum Route
1:40,000
Issue
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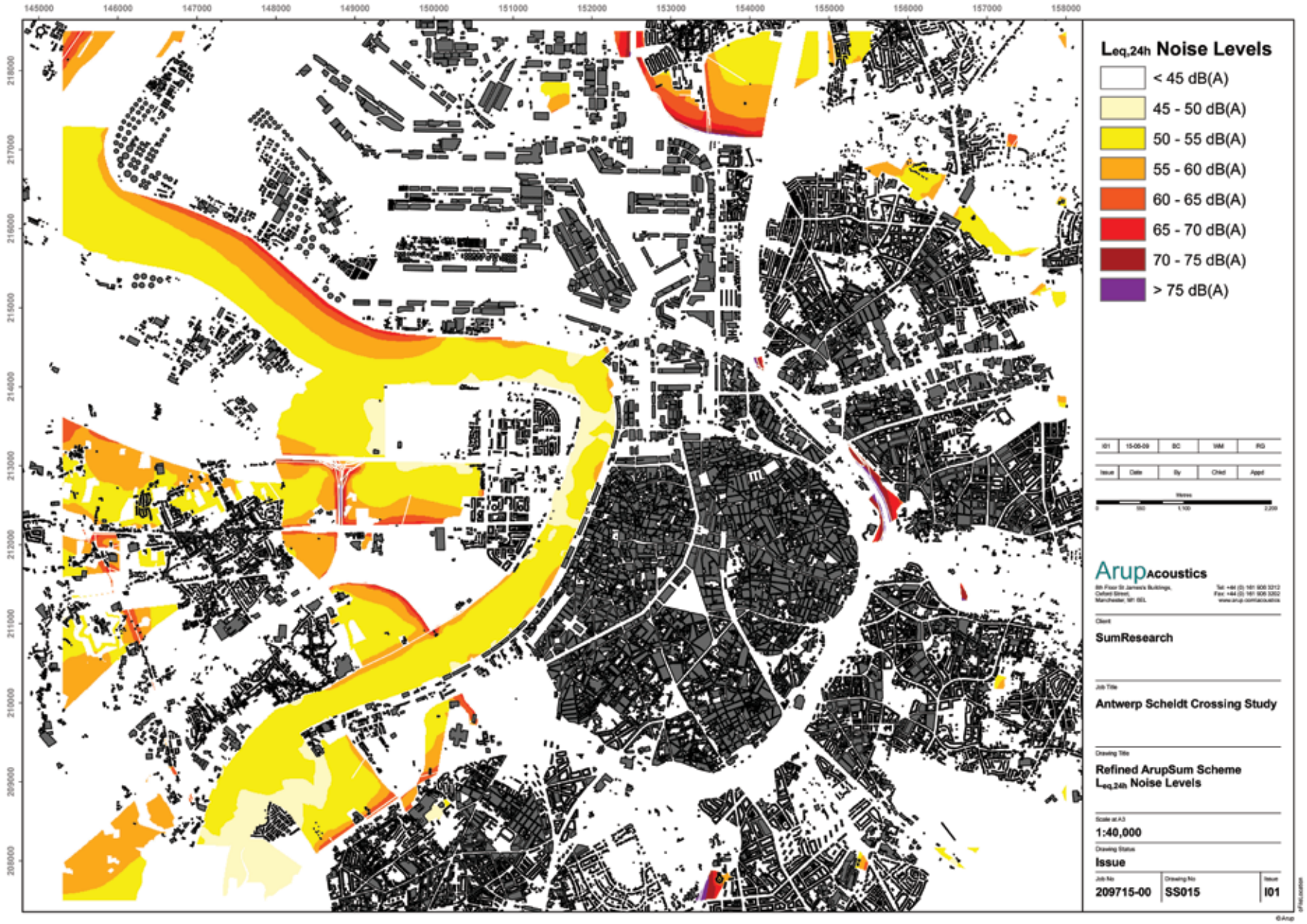
SS014
I01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Leq,24h Noise Levels
< 45 dB(A)
45 - 50 dB(A)
50 - 55 dB(A)
55 - 60 dB(A)
60 - 65 dB(A)
65 - 70 dB(A)
70 - 75 dB(A)
> 75 dB(A)
I01
15-06-09
SC
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RG
Issue
Date
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Chkd
Appd
Metres
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Arup Acoustics
8th Floor St James's Buildings,
Oxford Street,
Manchester, M1 6EL
Tel: +44 (0) 161 906 3312
Fax: +44 (0) 161 906 3352
www.arup.com/acoustics
Client
SumResearch
Job Title
Antwerp Scheldt Crossing Study
Drawing Title
Refined ArupSum Scheme
Leq,24h Noise Levels
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Drawing No
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Issue
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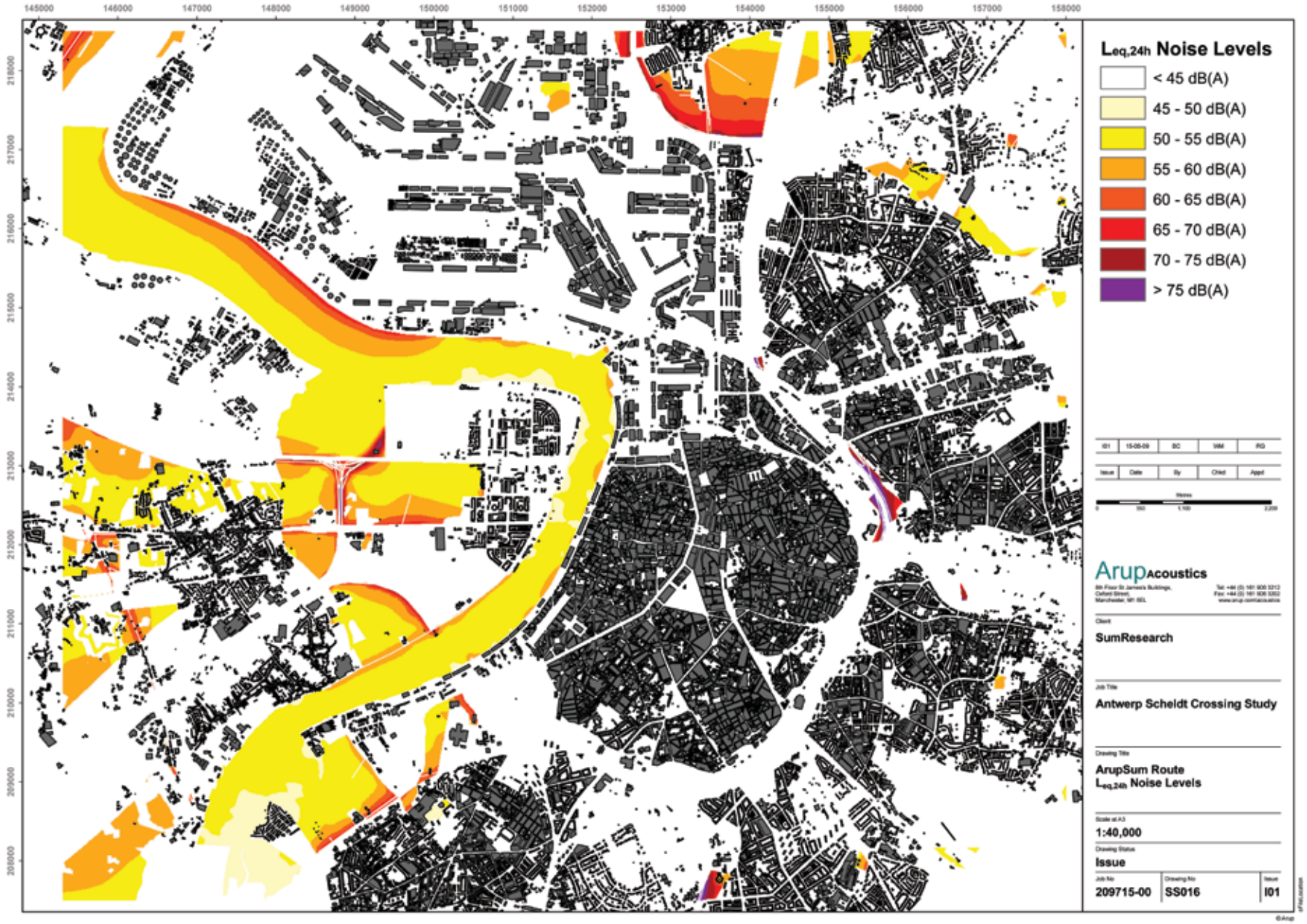
©Arup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Leq,24h Noise Levels
< 45 dB(A)
45 - 50 dB(A)
50 - 55 dB(A)
55 - 60 dB(A)
60 - 65 dB(A)
65 - 70 dB(A)
70 - 75 dB(A)
> 75 dB(A)
I01
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Date
By
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Arup Acoustics
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Tel: +44 (0) 161 906 3312
Fax: +44 (0) 161 906 3352
www.arup.com/acoustics
Client
SumResearch
Job Title
Antwerp Scheldt Crossing Study
Drawing Title
ArupSum Route
Leq,24h Noise Levels
Scale at A3
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Drawing Status
Issue
Job No
209715-00
Drawing No
SS016
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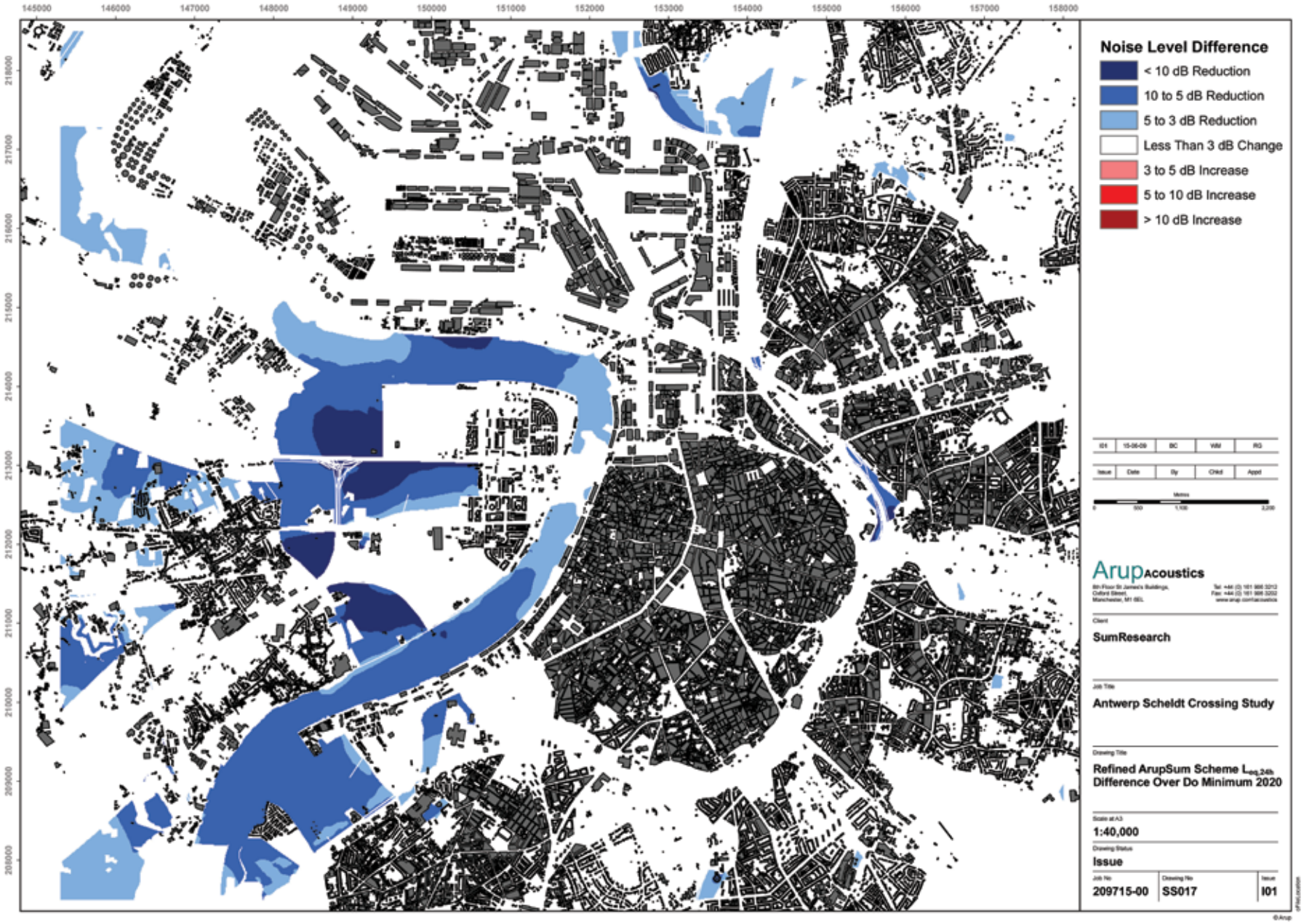
I01
© Arup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Noise Level Difference
< 10 dB Reduction
10 to 5 dB Reduction
5 to 3 dB Reduction
Less Than 3 dB Change
3 to 5 dB Increase
5 to 10 dB Increase
> 10 dB Increase
Arup Acoustics
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Antwerp Scheldt Crossing Study
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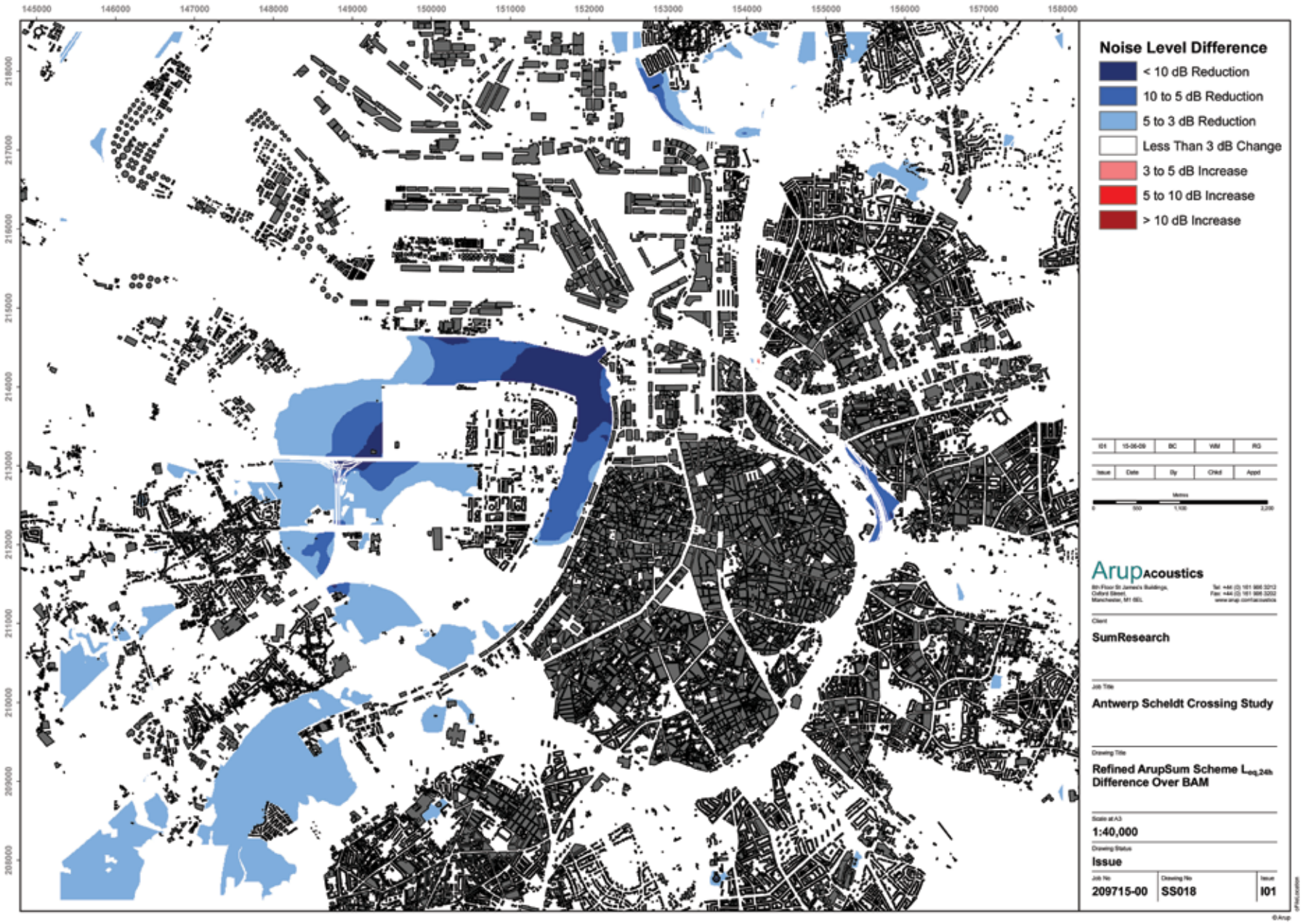
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Noise Level Difference
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Arup Acoustics
Client
SumResearch
Job Title
Antwerp Scheldt Crossing Study
Drawing Title
Refined ArupSum Scheme Leq,24h Difference Over BAM
Scale at A3
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Drawing Status
Issue
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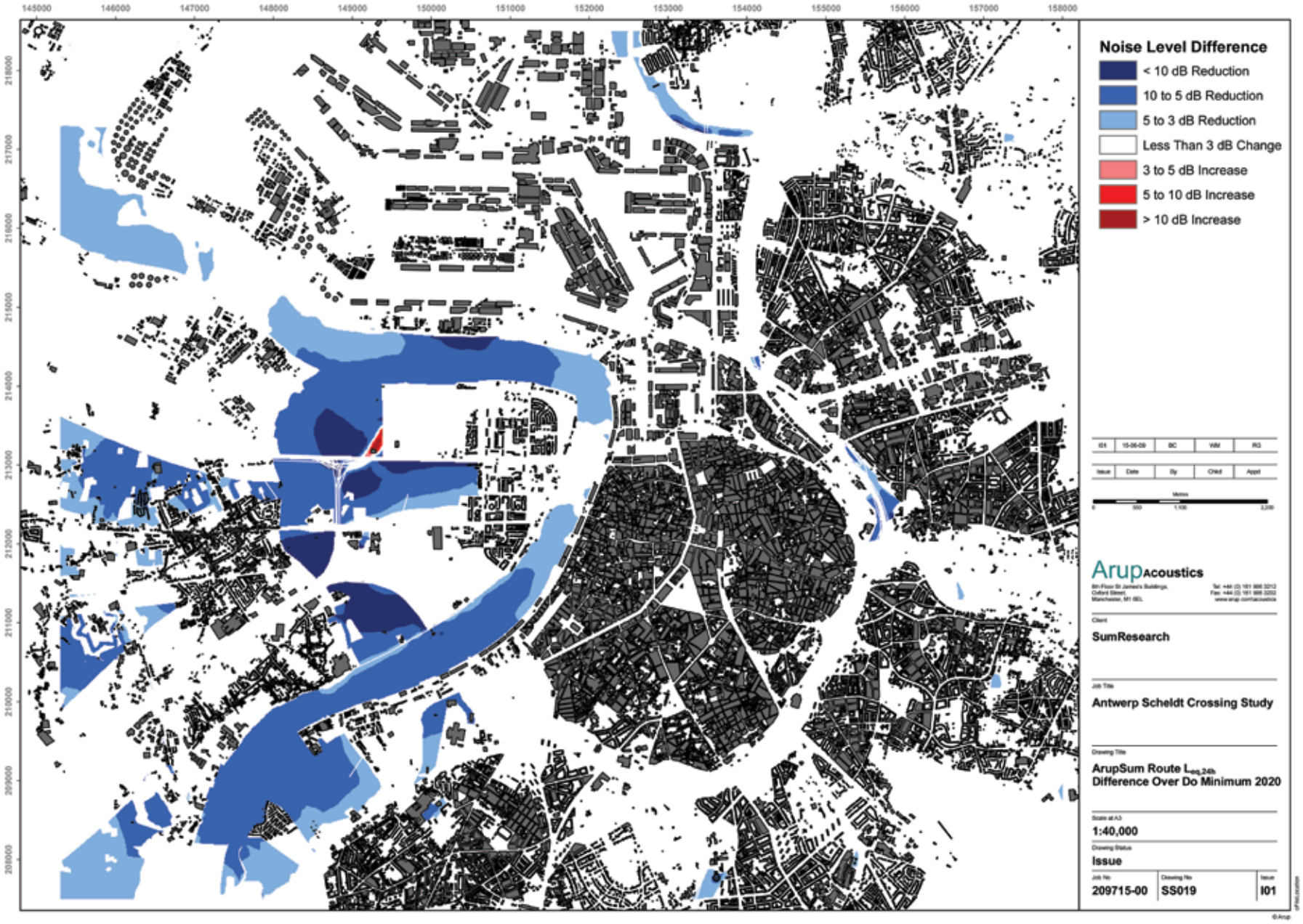
I01
© Arup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Noise Level Difference
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5 to 3 dB Reduction
Less Than 3 dB Change
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> 10 dB Increase
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Issue
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Arup Acoustics
Client
SumResearch
Job Title
Antwerp Scheldt Crossing Study
Drawing Title
ArupSum Route $L_{eq,24h}$
Difference Over Do Minimum 2020
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Drawing Status
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Drawing No
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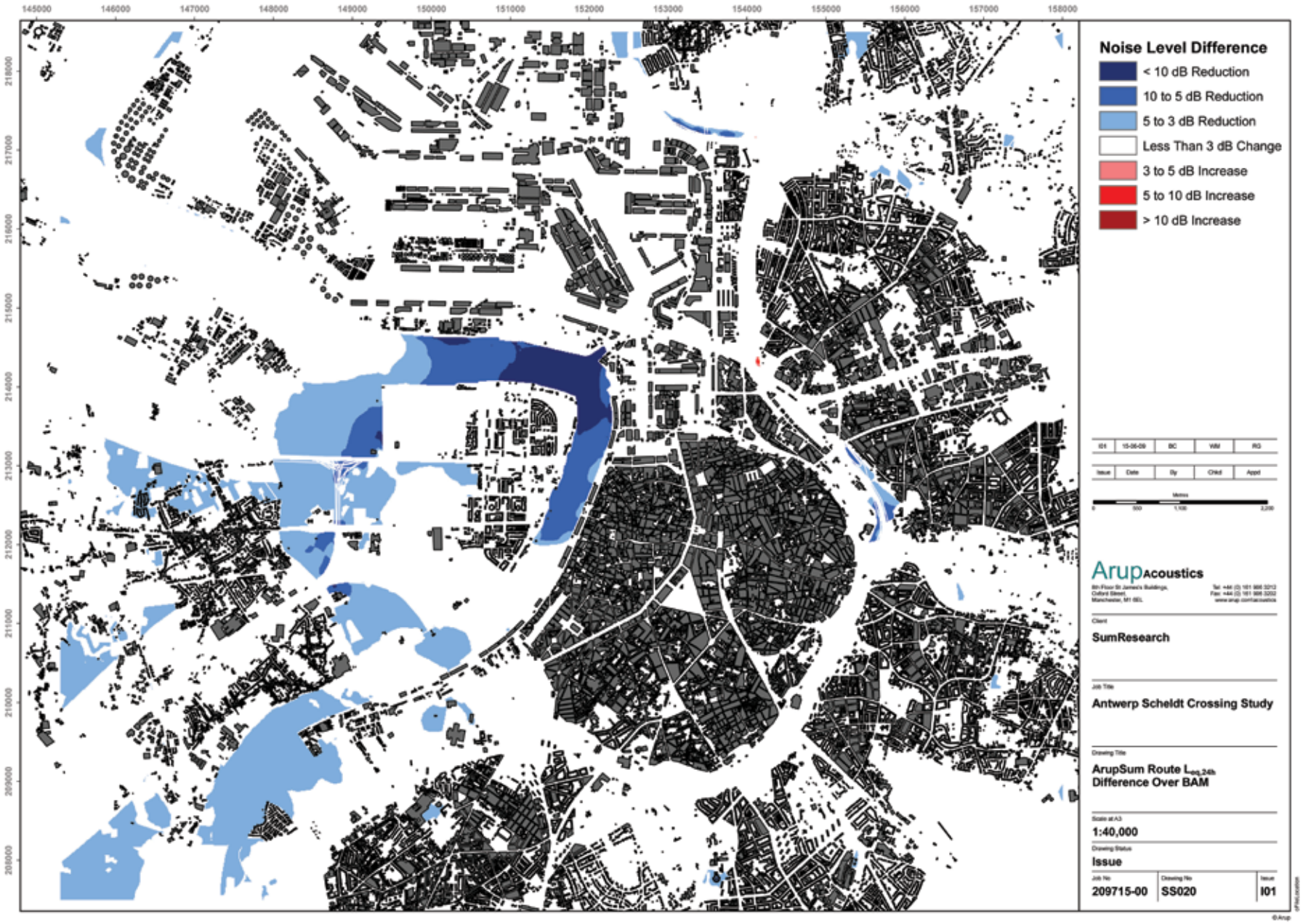
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Arup Acoustics
8th Floor St James's Buildings,
Oxford Street,
Manchester, M1 6EL
Tel: +44 (0) 161 999 3213
Fax: +44 (0) 161 999 3202
www.arup.com/acoustics
Client
SumResearch
Job Title
Antwerp Scheldt Crossing Study
Drawing Title
ArupSum Route $L_{eq,24h}$
Difference Over BAM
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Drawing Status
Issue
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Drawing No
SS020
Issue
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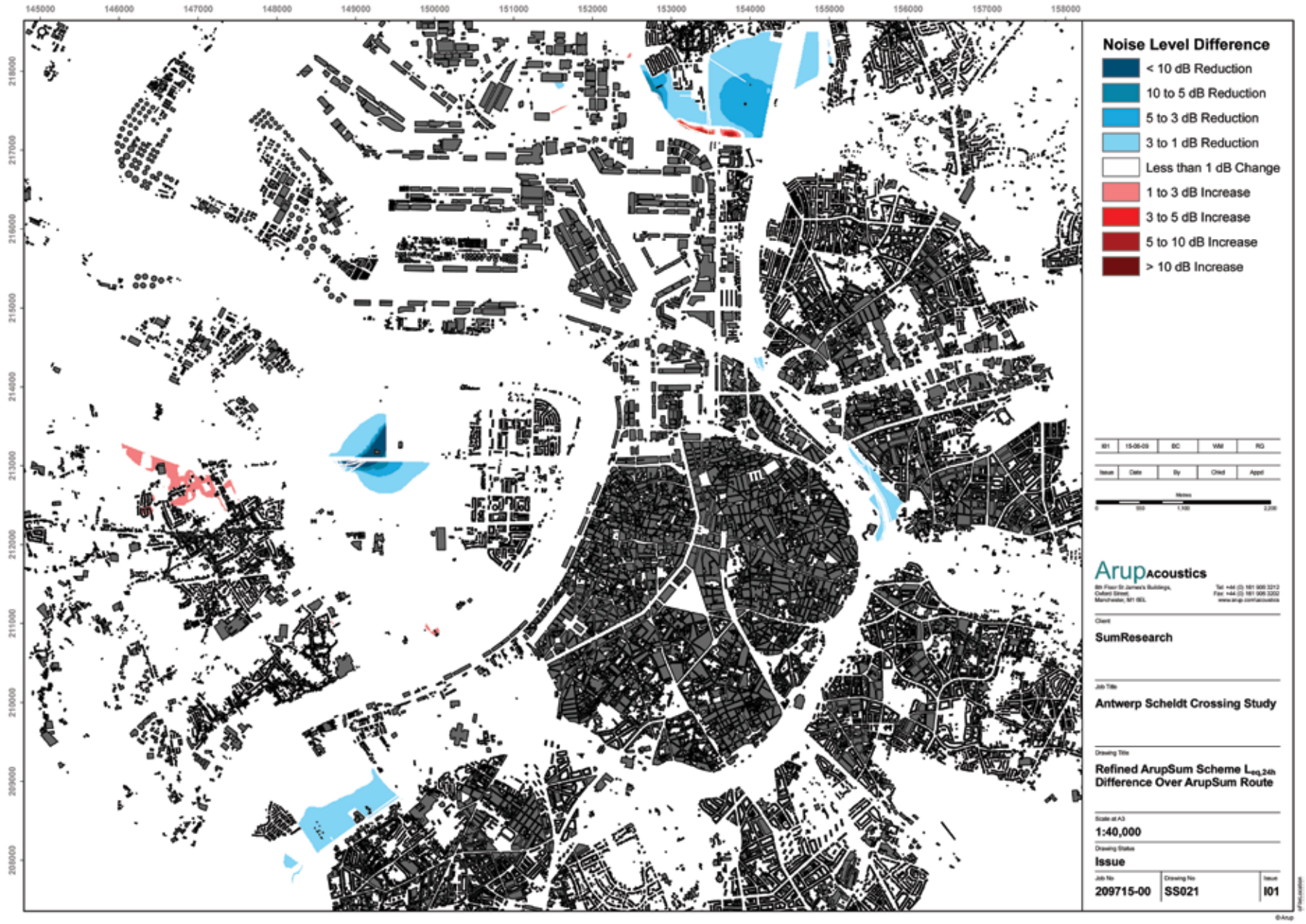
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Noise Level Difference
< 10 dB Reduction
10 to 5 dB Reduction
5 to 3 dB Reduction
3 to 1 dB Reduction
Less than 1 dB Change
1 to 3 dB Increase
3 to 5 dB Increase
5 to 10 dB Increase
> 10 dB Increase
Arup Acoustics
Client
SumResearch
Job Title
Antwerp Scheldt Crossing Study
Drawing Title
Refined ArupSum Scheme $L_{eq,24h}$ Difference Over ArupSum Route
Scale at A3
1:40,000
Drawing Status
Issue
Job No
209715-00
Drawing No
SS021
Issue
I01

A12
AIR QUALITY TECHNICAL APPENDIX

4. AIR QUALITY TECHNICAL APPENDIX

This appendix includes the air quality concentrations contour mapping prepared from the output of the air quality model. For both the 4th Route Option and the Refined 4th Option, contour plans have been prepared to show:

- Absolute concentrations of NO2, PM10, by reference to the annual and hourly limit values, and of PM2.5 by reference to the annual limit value
- The difference in concentrations as a result of the scheme by reference to the Do Minimum scenario
- The difference in concentrations between the options, and with BAM

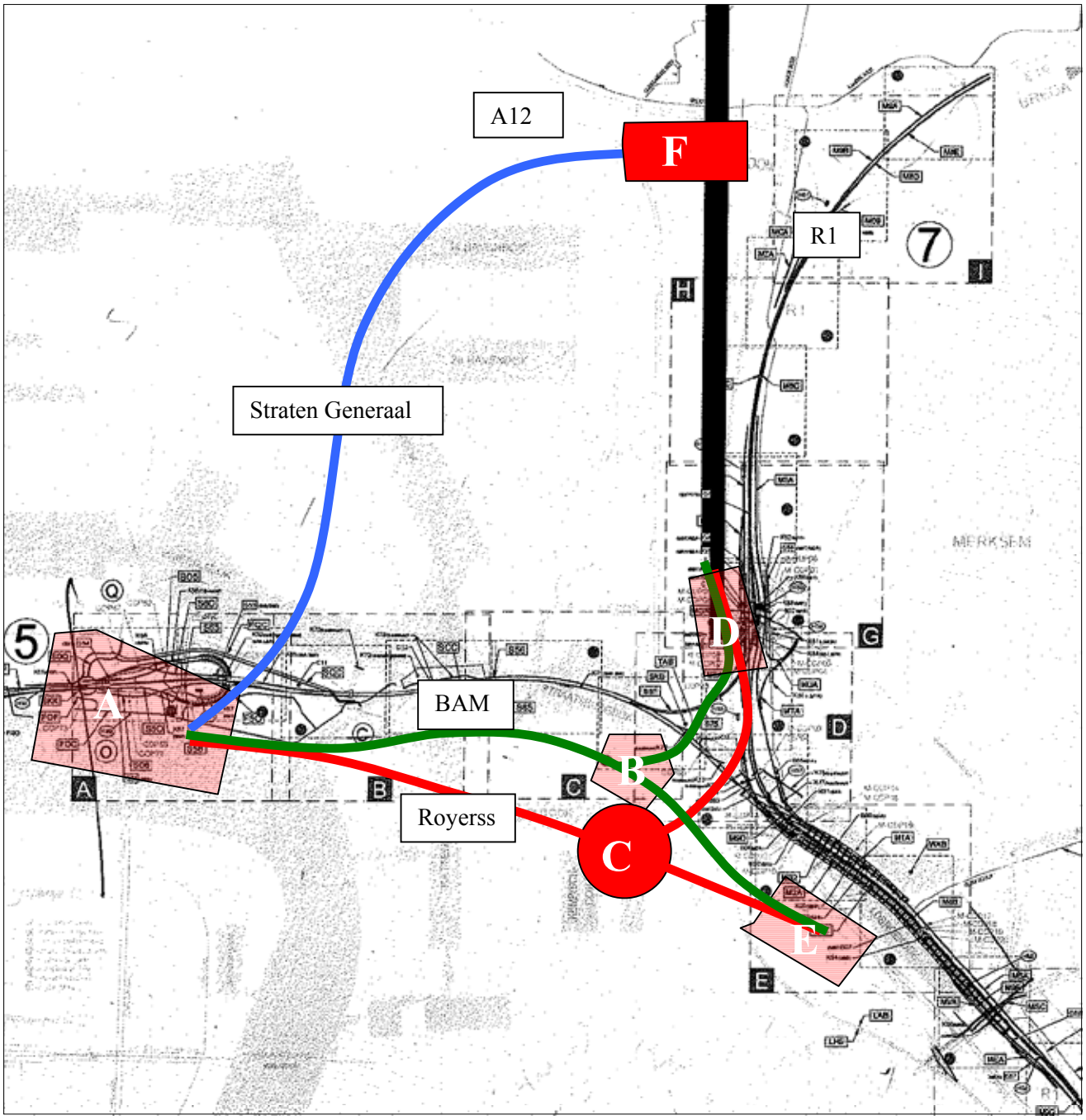
Key to Contour Plans

T2/Test 2 _____ 4th Route Option

T3/Test 3 _____ Refined 4th Option

BAM _____ BAM scheme

DM _____ Do Minimum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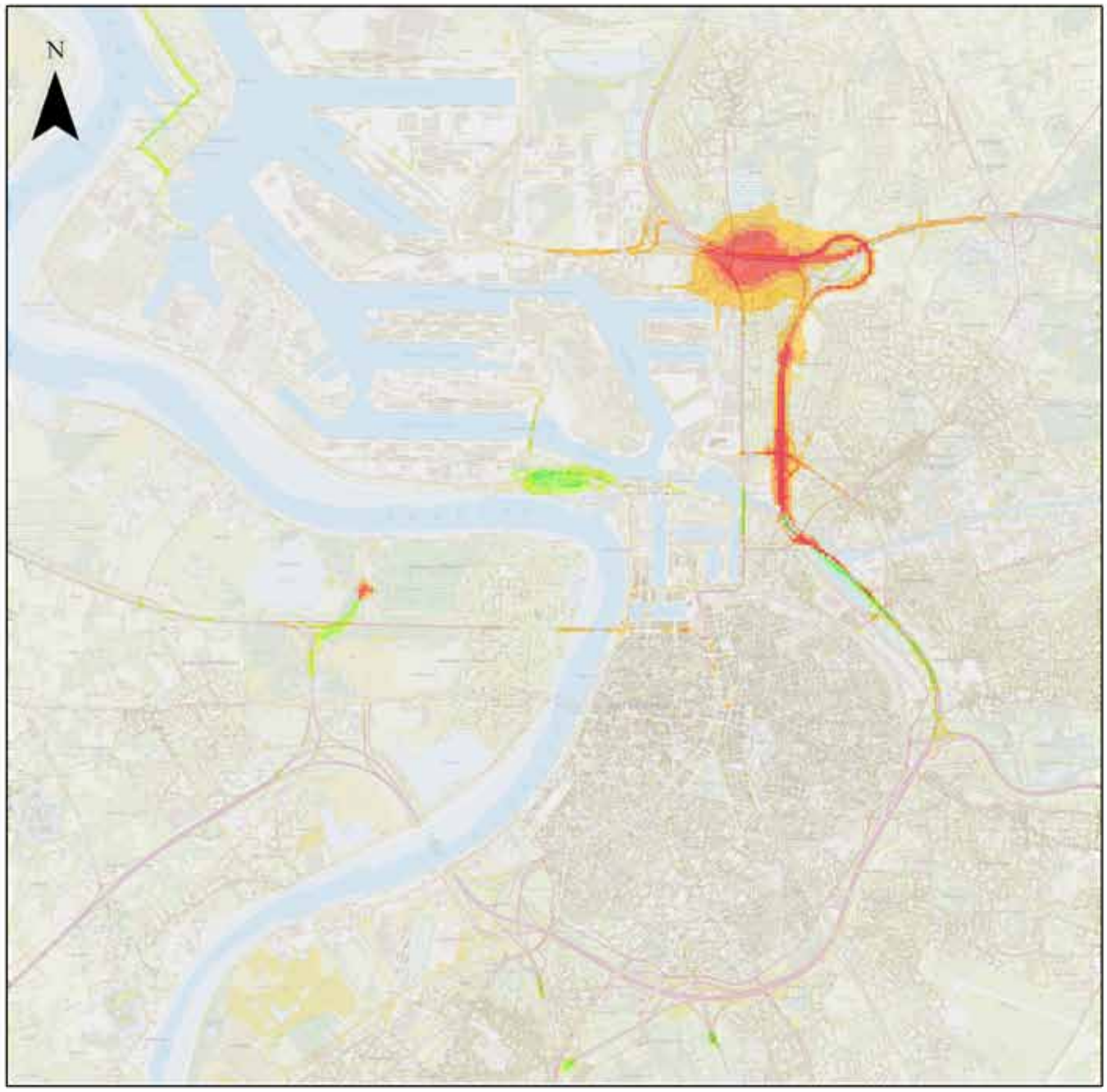
F
R1
Straten Generaal
BAM
Royerss
A
B
C
D
E
MERKSEM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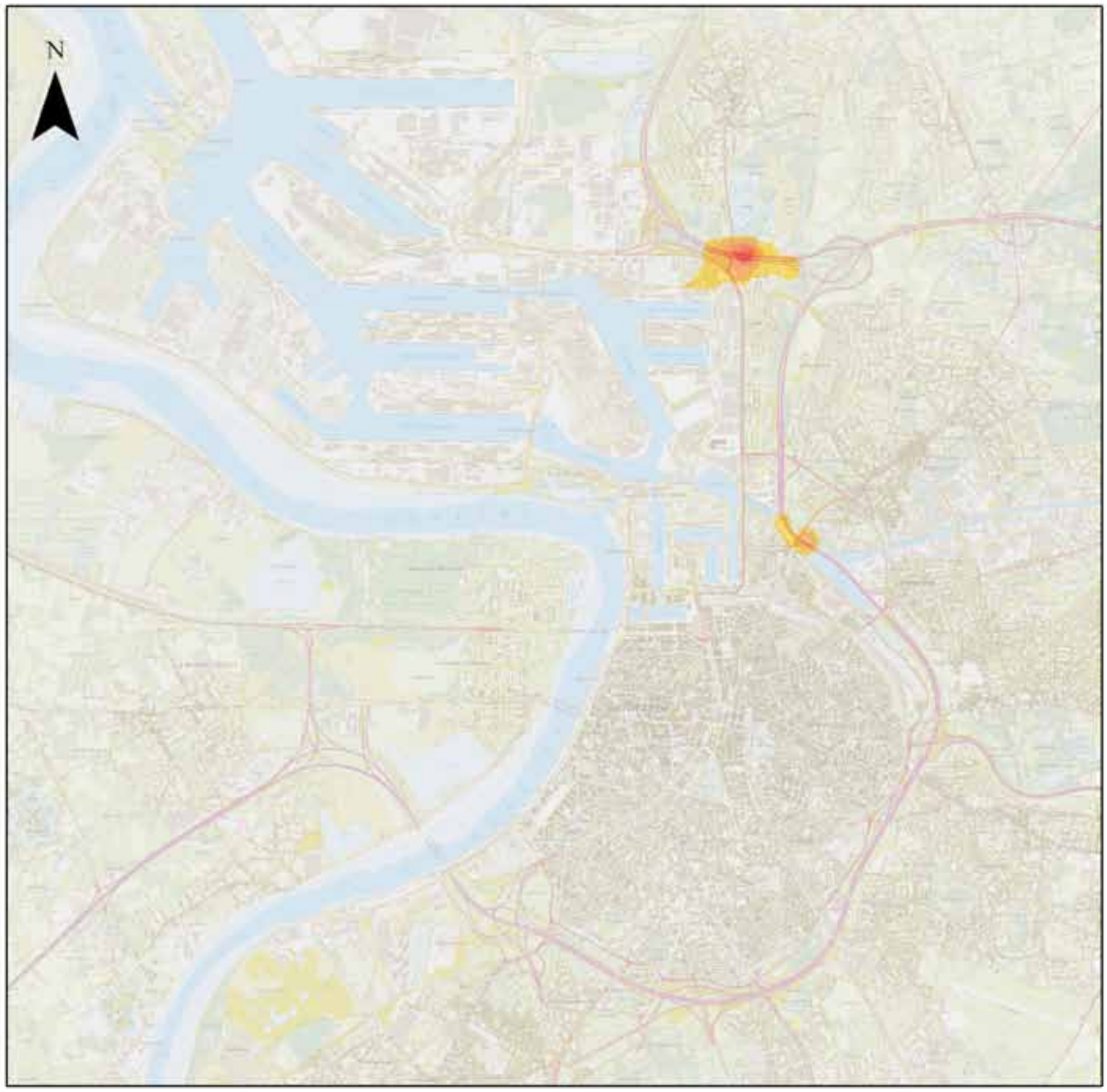
Difference between BAM and T2 2020
Annual Mean NO2
All concentrations in microgrammes per cubic metre
-15 or less
-10
-5
-5 to 5
5
10
15 or more
0 0.5 1 2 Km



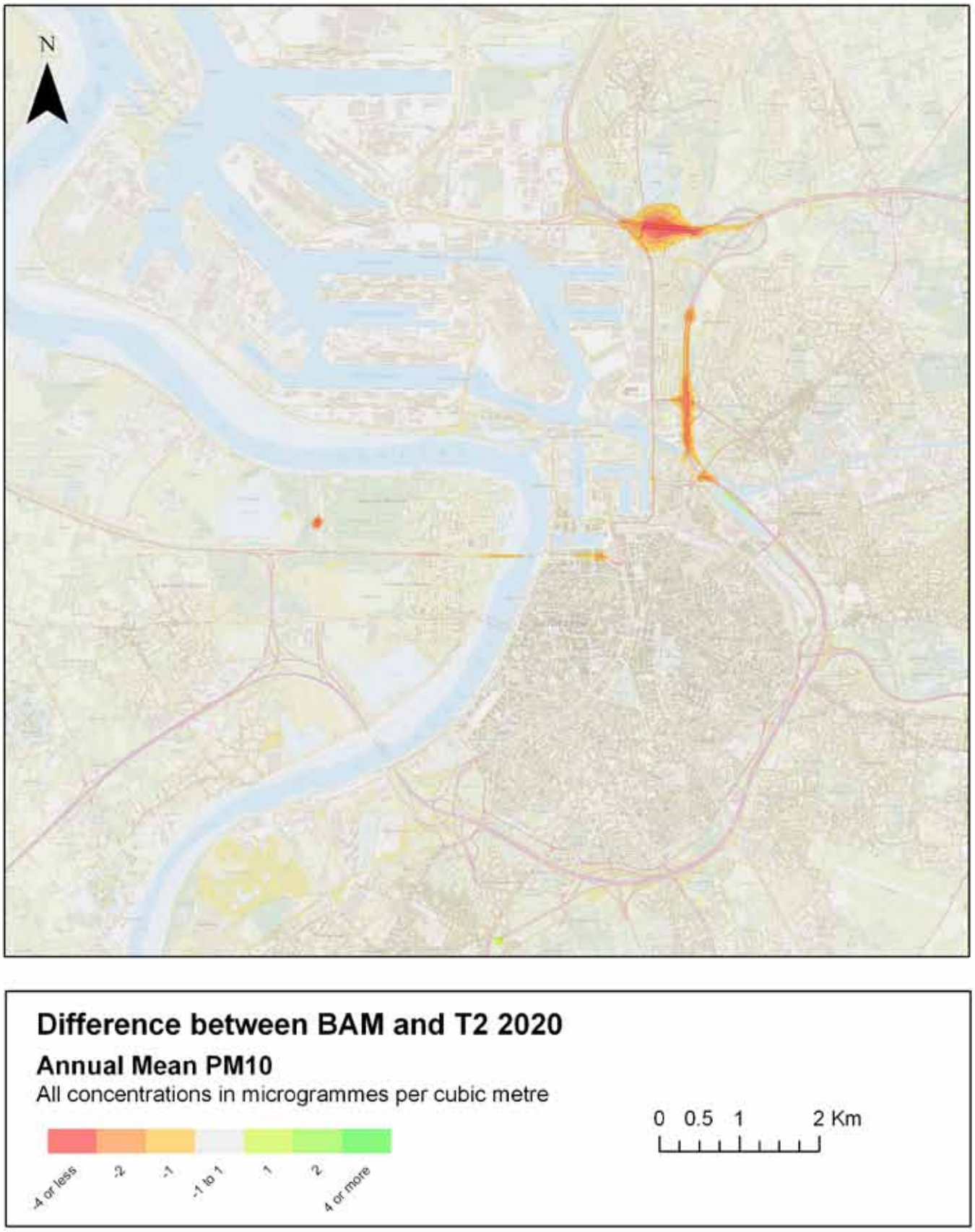
Difference between BAM and T2 2020

Daily Mean (90.41st Percentile) PM10

All concentrations in microgrammes per cubic metre

-6 or less | -4 | -2 | -1 | -1 to 1 | 1 | 2 | 4 | 6 or more

0 0.5 1 2 Km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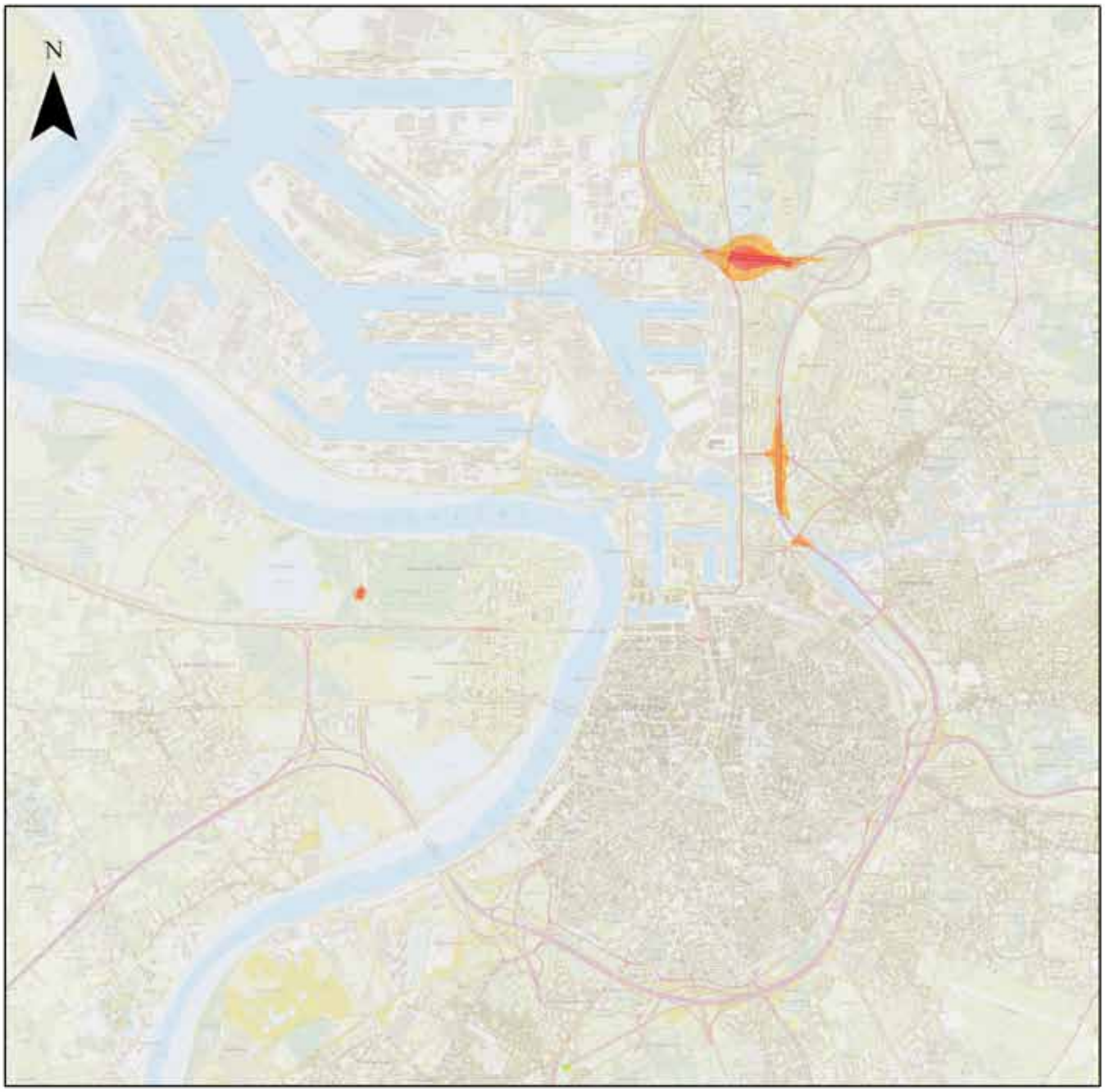
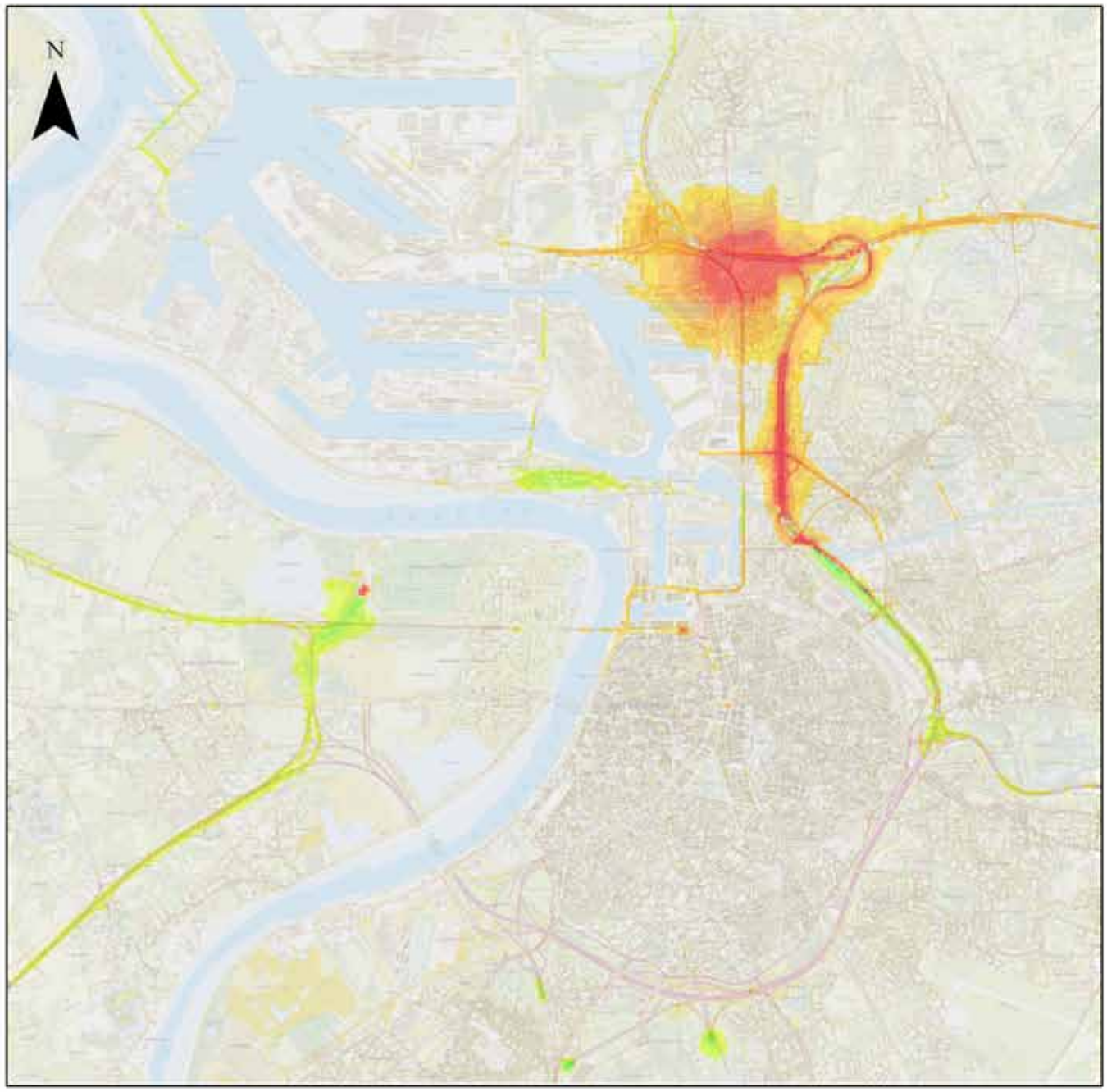
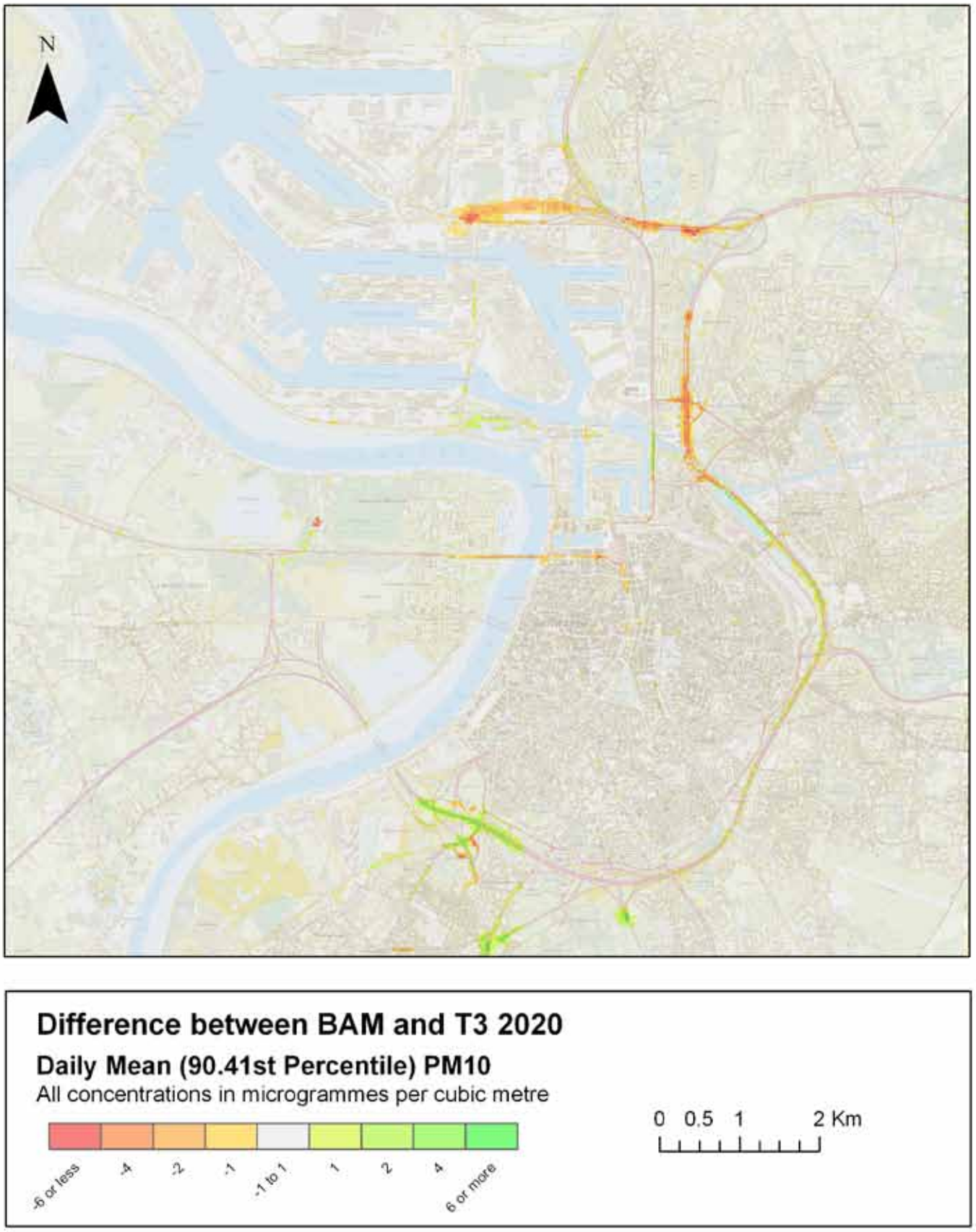
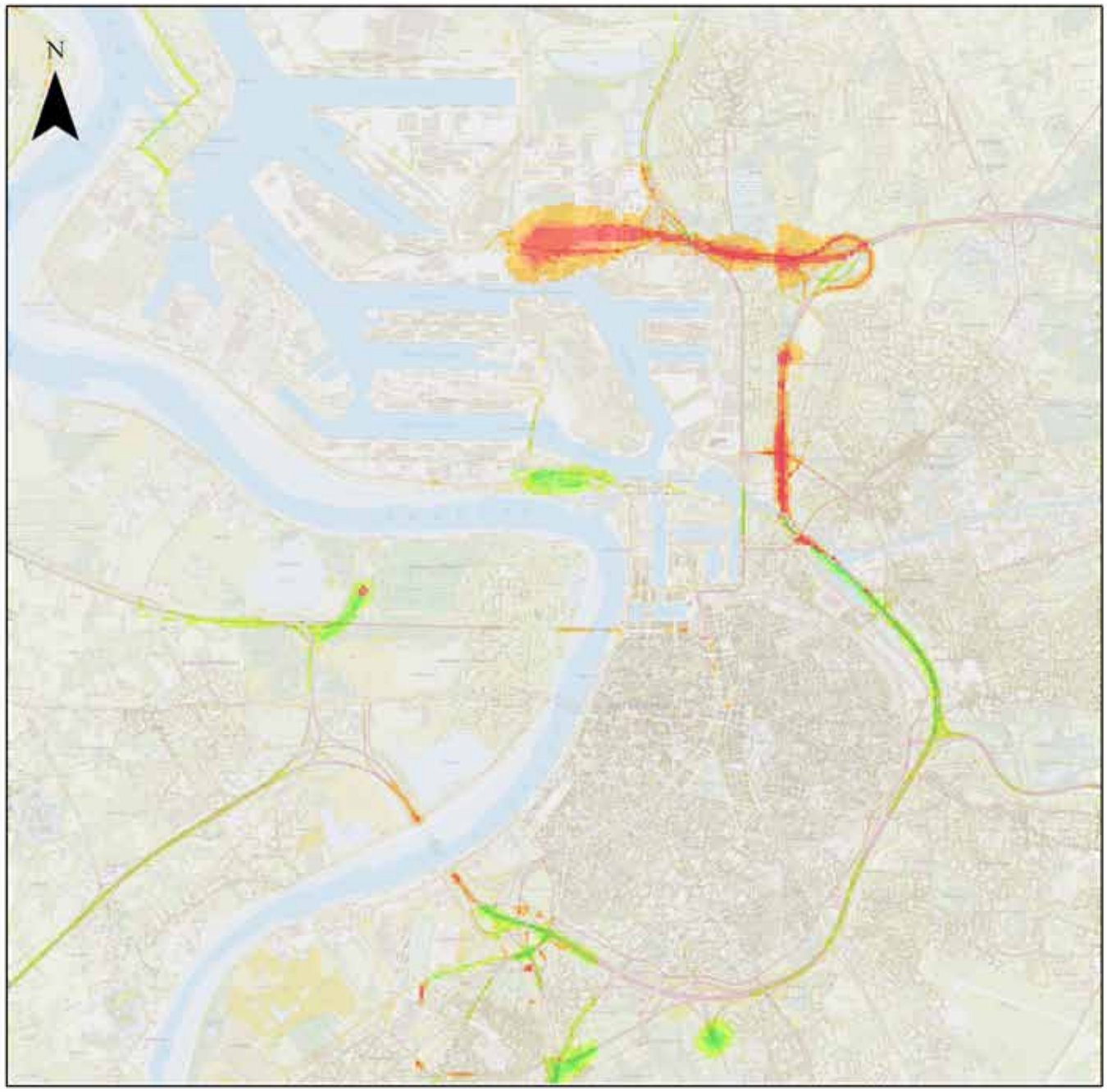
Difference between BAM and T2 2020
Annual Mean PM10
All concentrations in microgrammes per cubic metre
-4 or less
-2
-1
-1 to 1
1
2
4 or more
0 0.5 1 2 Km


N
Difference between BAM and T2 2020
Annual Mean PM2.5
All concentrations in microgrammes per cubic metre
-3 or less
-1
-1 to 1
1
3 or more
0 0.5 1 2 Km


N
Difference between BAM and T2 2020
Hourly Mean (99.79th Percentile) NO2
All concentrations in microgrammes per cubic metre
-80 or less
-60
-40
-20
-10
-10 to 10
10
20
40
60
80 or more
0 0.5 1 2 Km

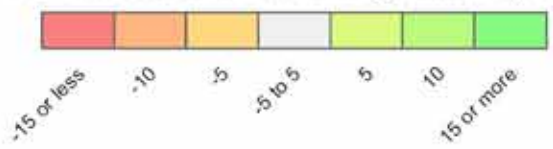

N
Difference between BAM and T3 2020
Daily Mean (90.41st Percentile) PM10
All concentrations in microgrammes per cubic metre
-6 or less
-4
-2
-1
-1 to 1
1
2
4
6 or more
0 0.5 1 2 Km

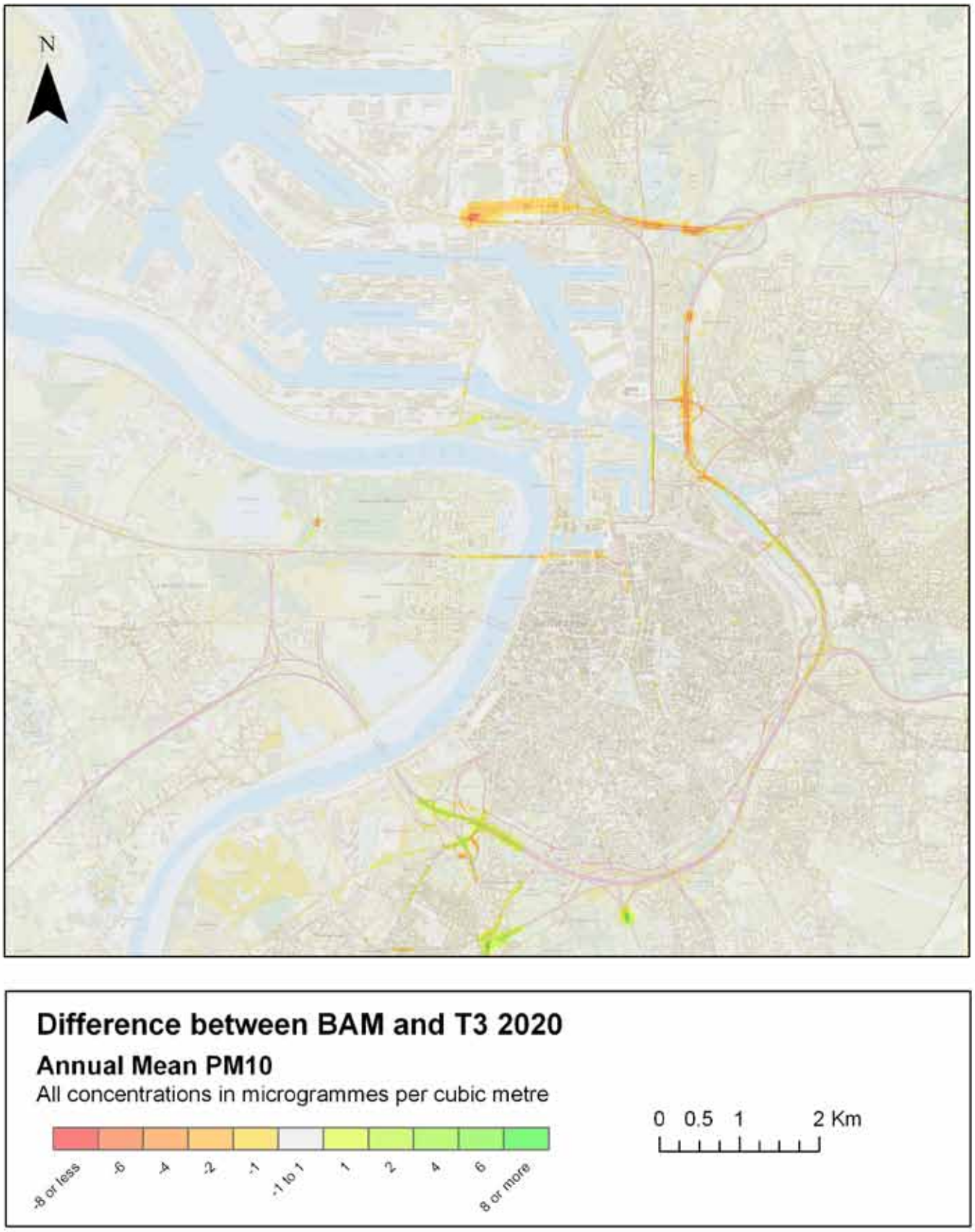


Difference between BAM and T3 2020

Annual Mean NO2

All concentrations in microgrammes per cubic metre

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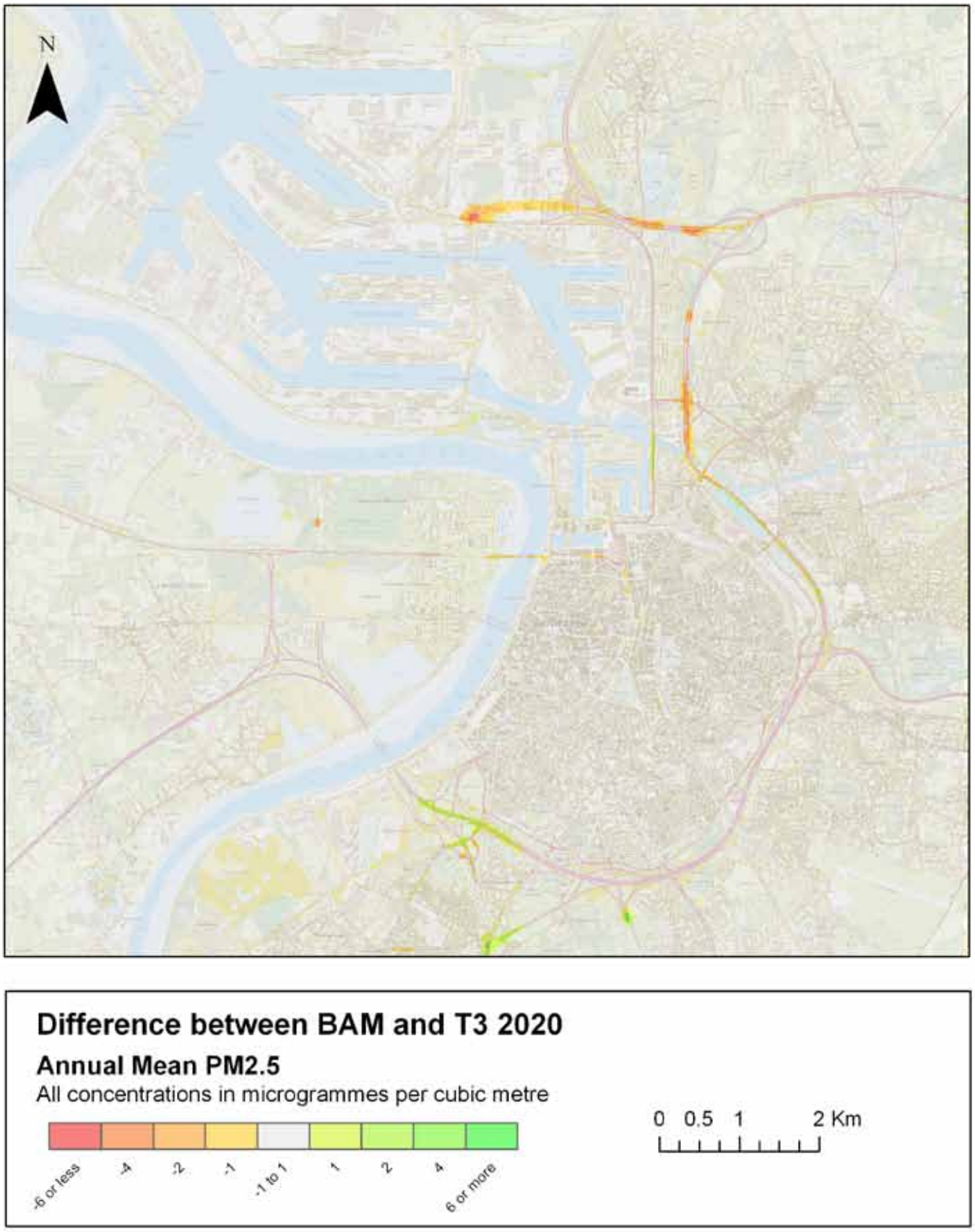
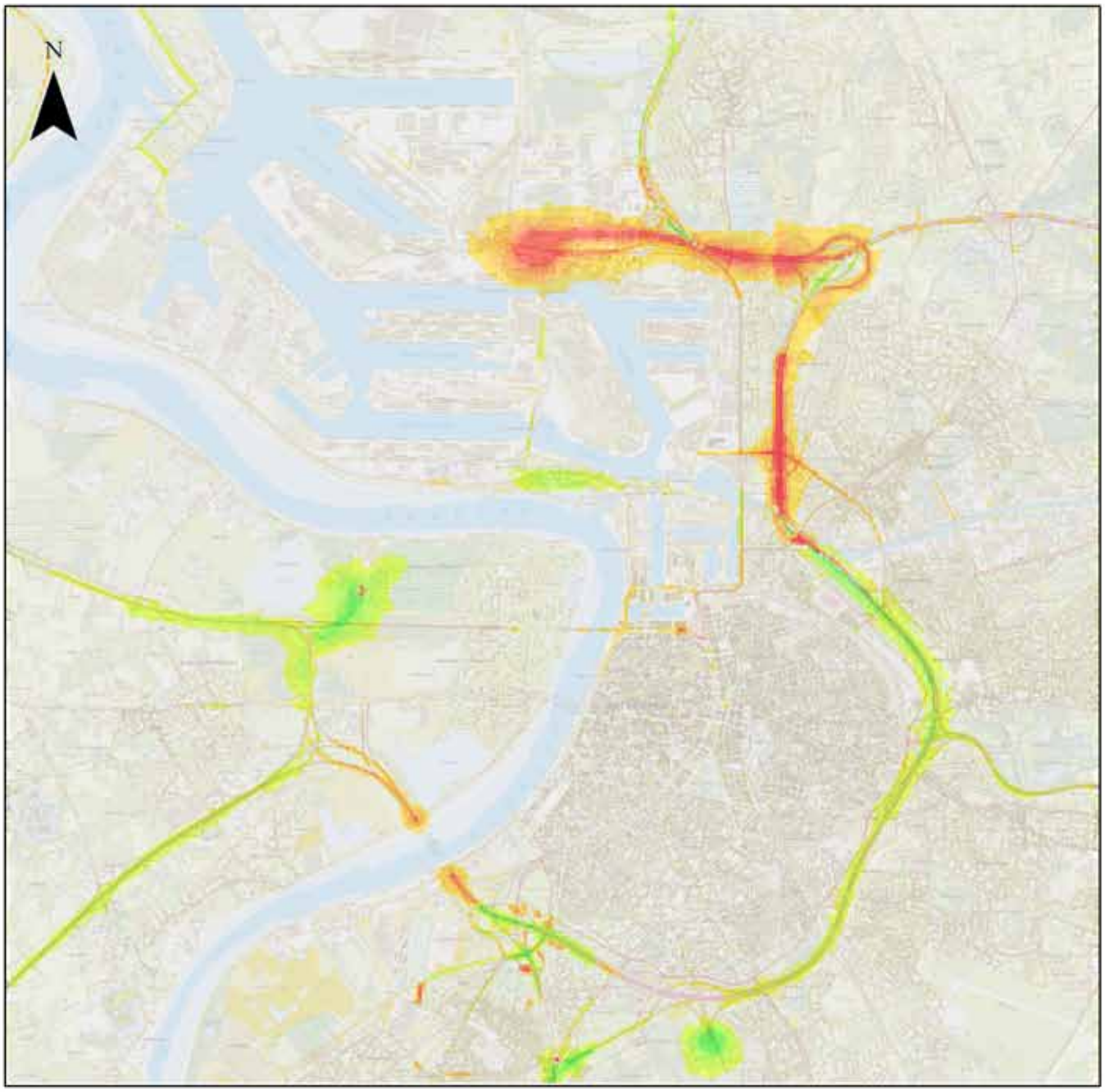
Difference between BAM and T3 2020
Annual Mean PM10
All concentrations in microgrammes per cubic metre
-8 or less
-6
-4
-2
-1
-1 to 1
1
2
4
6
8 or more
0 0.5 1 2 Km

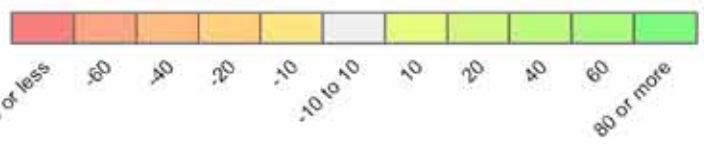

N
Difference between BAM and T3 2020
Annual Mean PM2.5
All concentrations in microgrammes per cubic metre
-6 or less
-4
-2
-1
-1 to 1
1
2
4
6 or more
0 0.5 1 2 Km

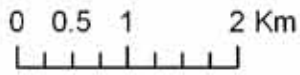


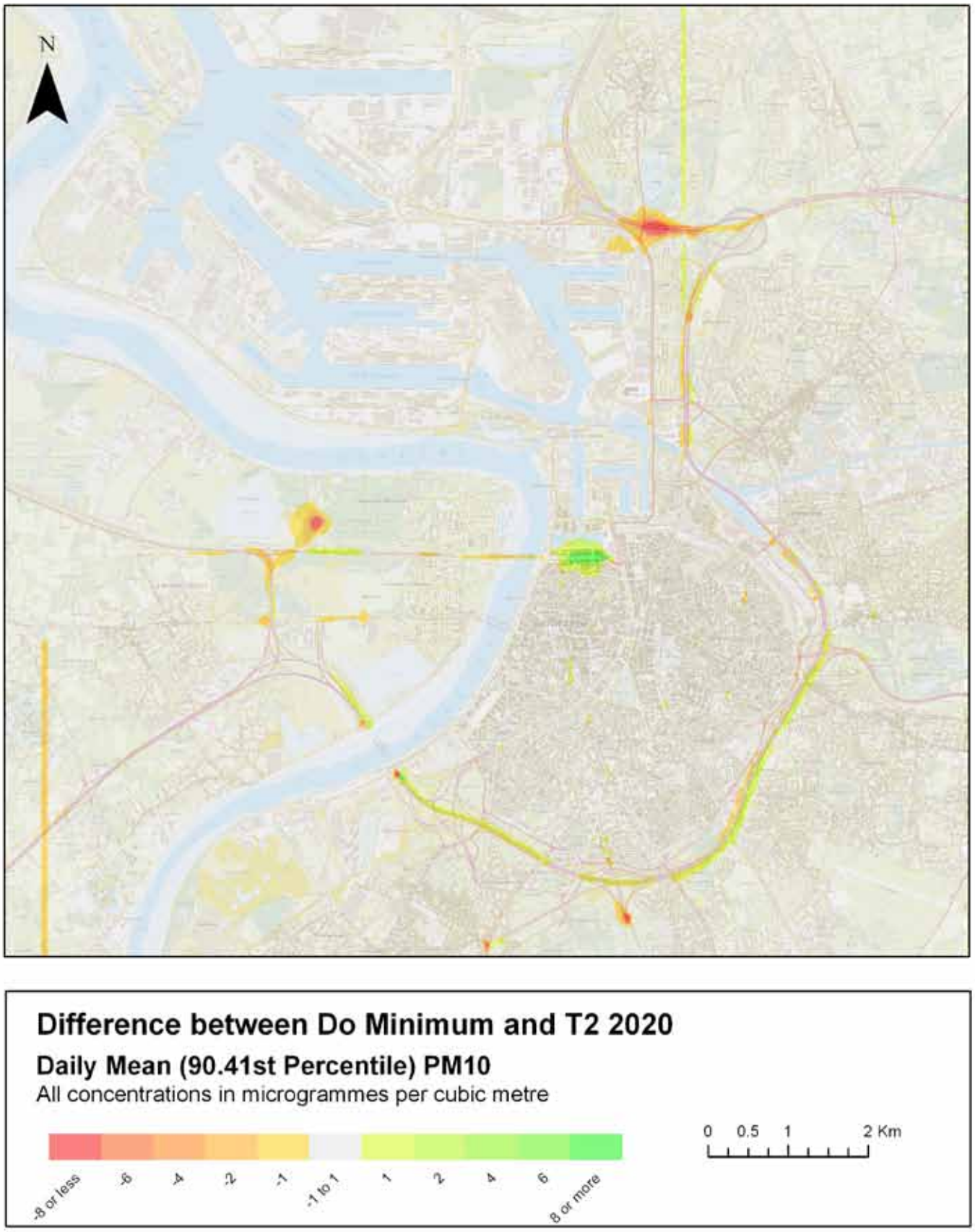
Difference between BAM and T3 2020

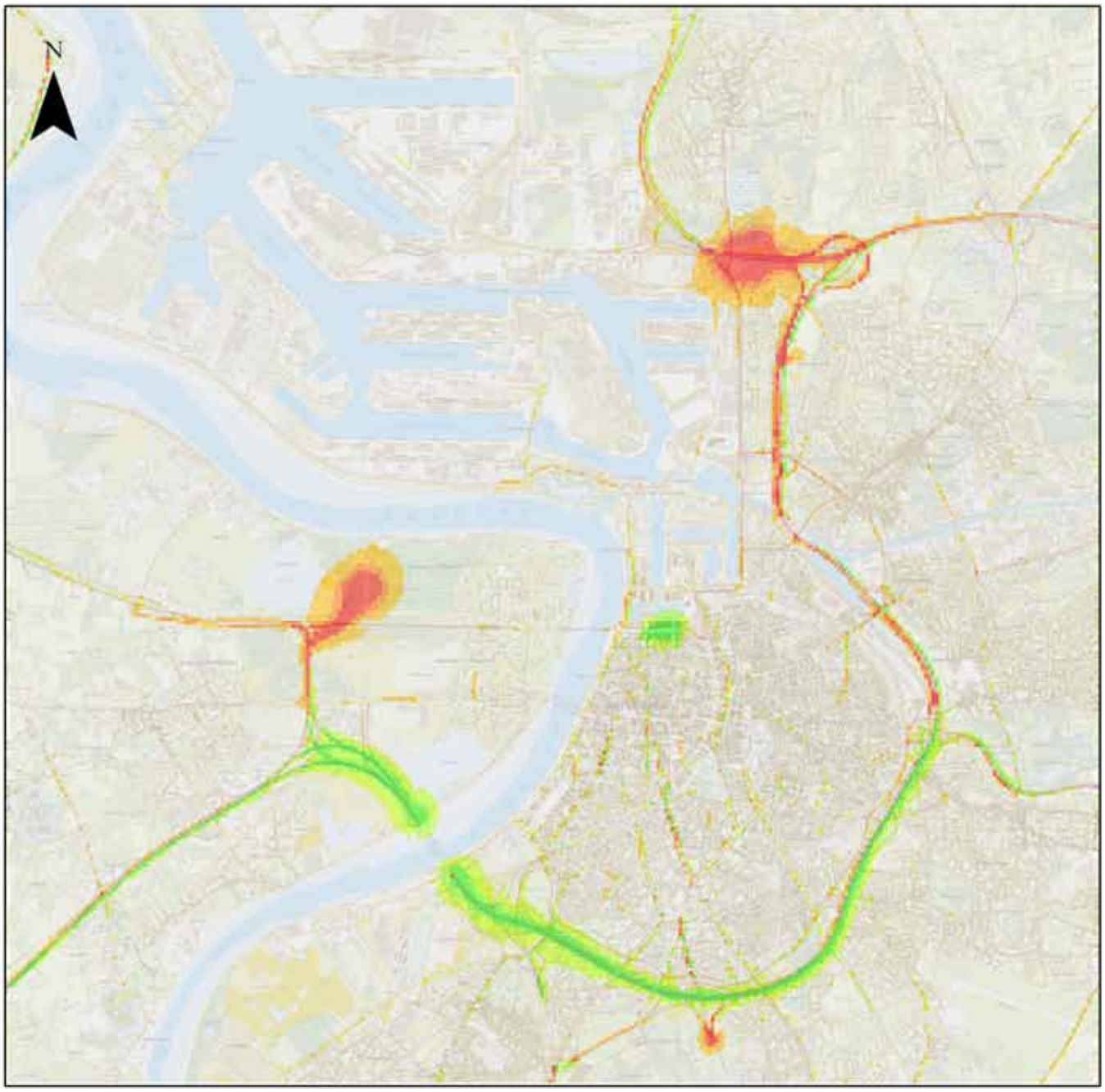
Hourly Mean (99.79th Percentile) NO2

All concentrations in microgrammes per cubic metre






N
Difference between Do Minimum and T2 2020
Daily Mean (90.41st Percentile) PM10
All concentrations in microgrammes per cubic metre
-8 or less
-6
-4
-2
-1
-1 to 1
1
2
4
6
8 or more
0
0.5
1
2 Km



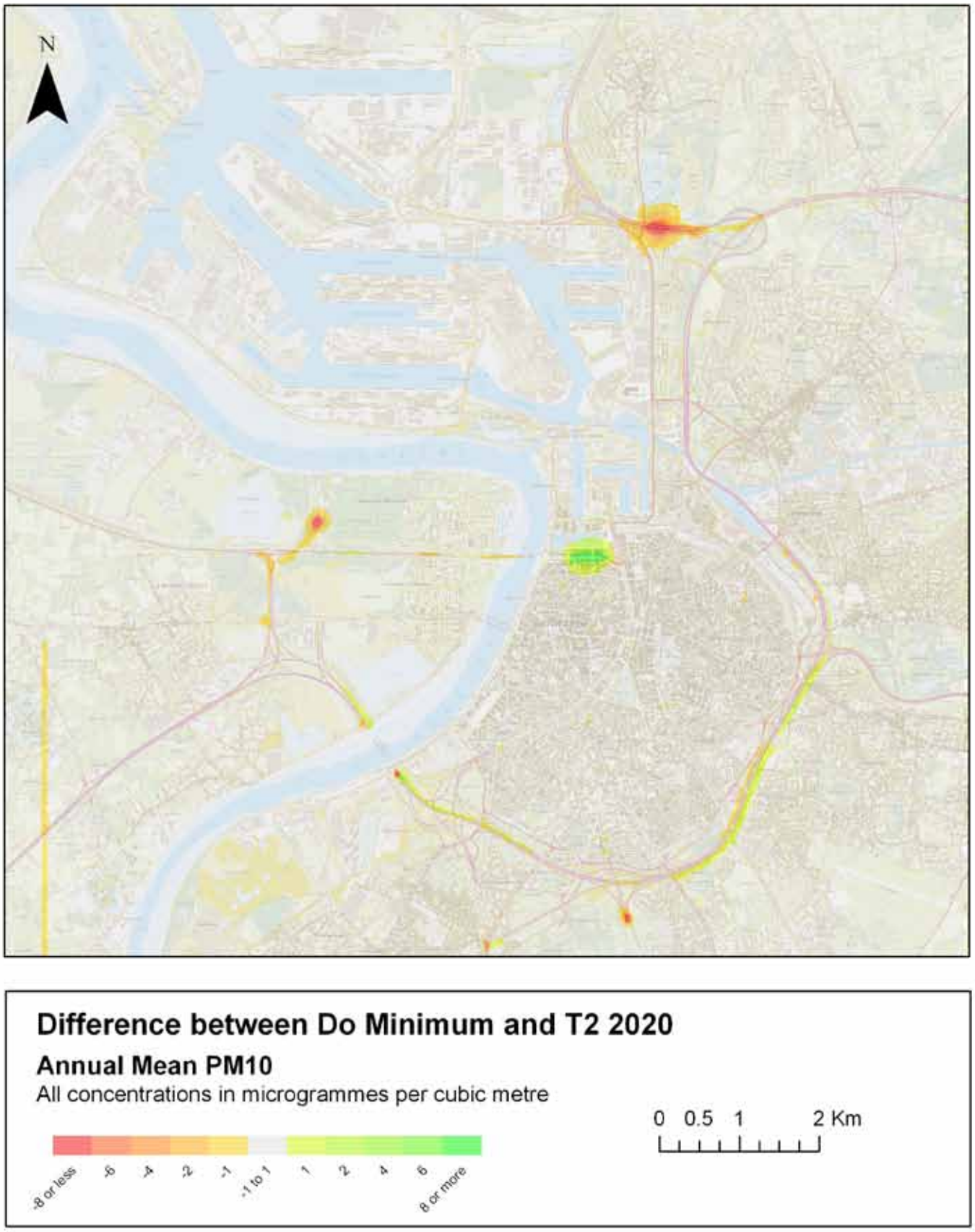
Difference between Do Minimum and T2 2020

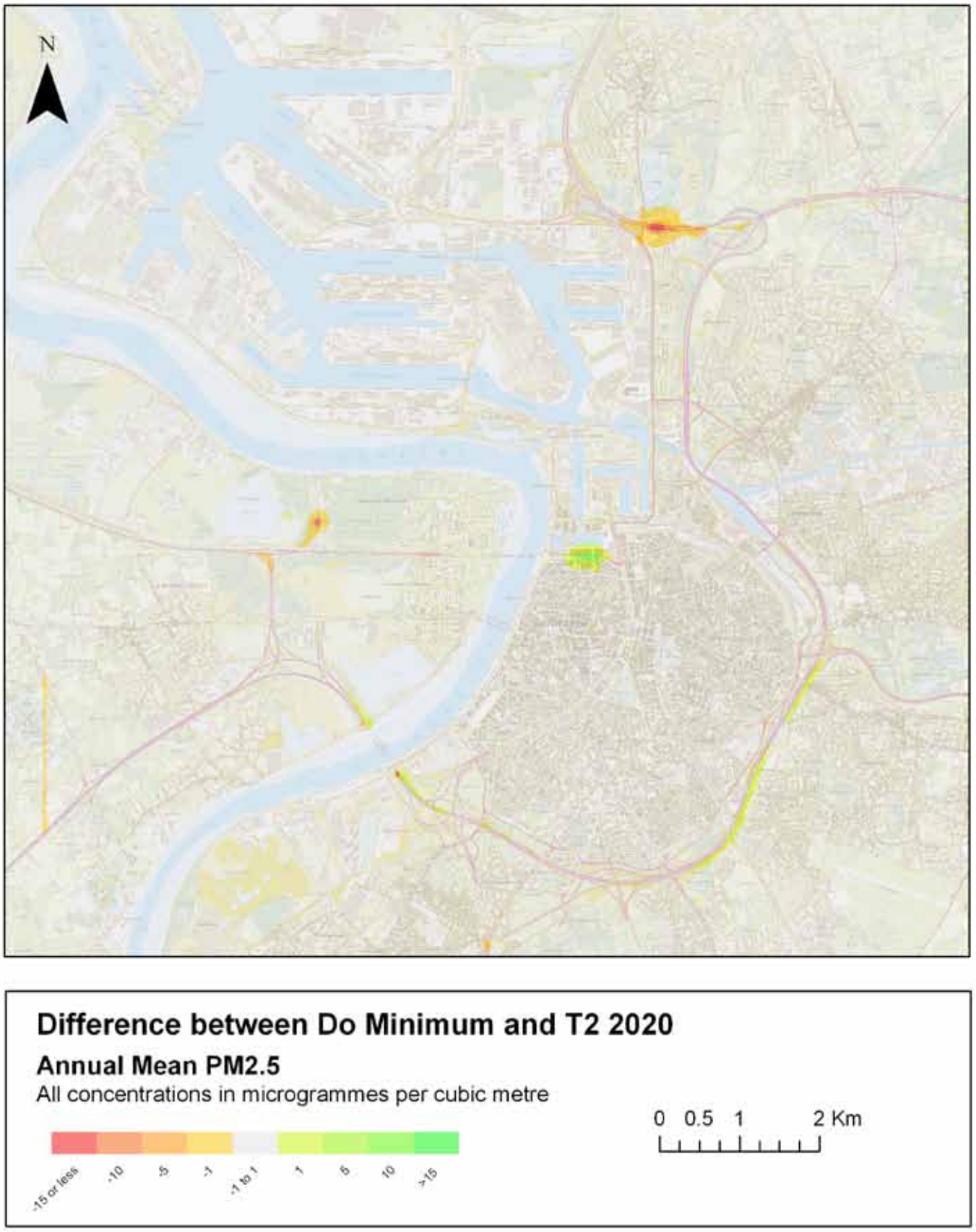
Annual Mean NO2

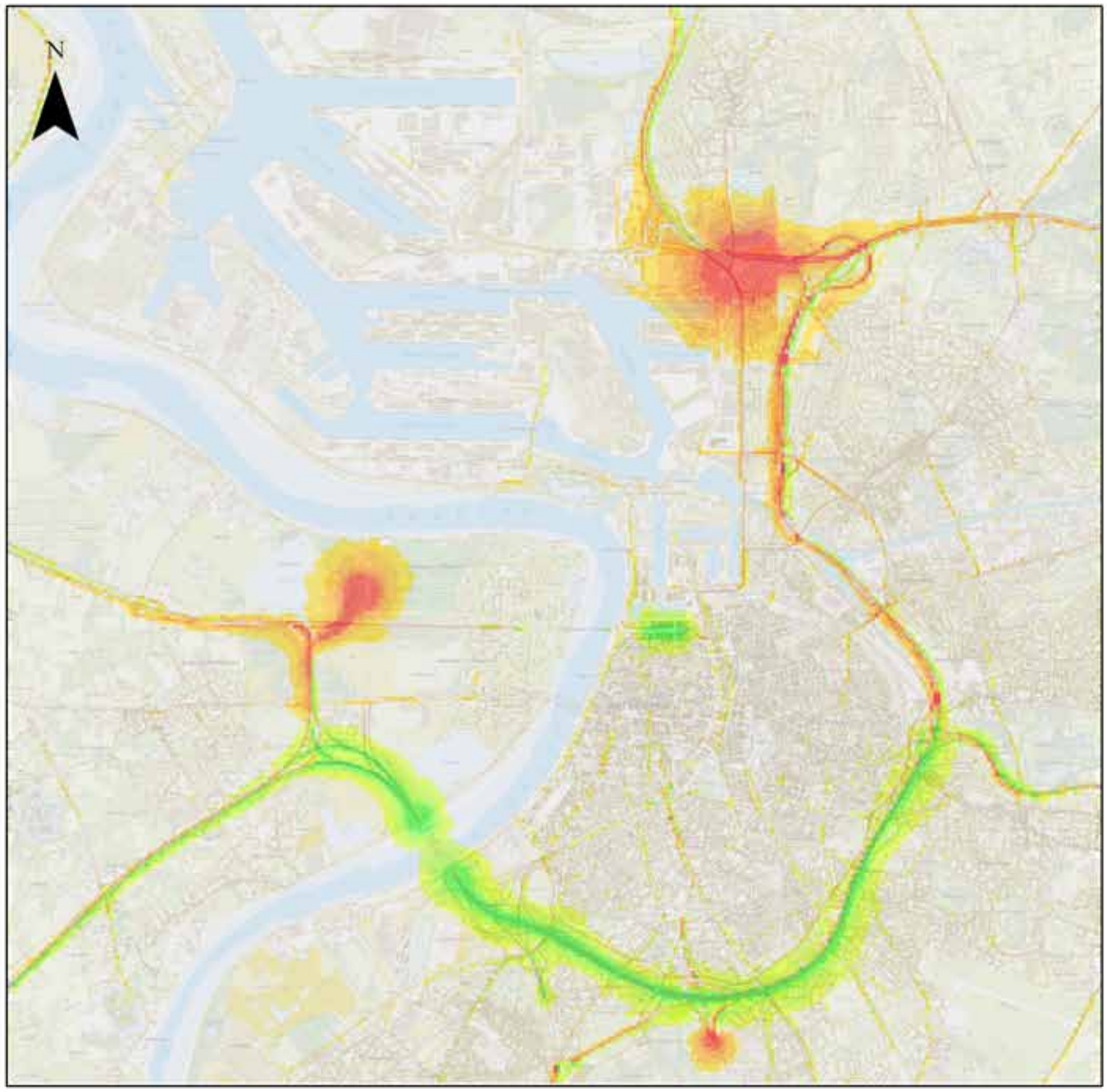
All concentrations in microgrammes per cubic metre

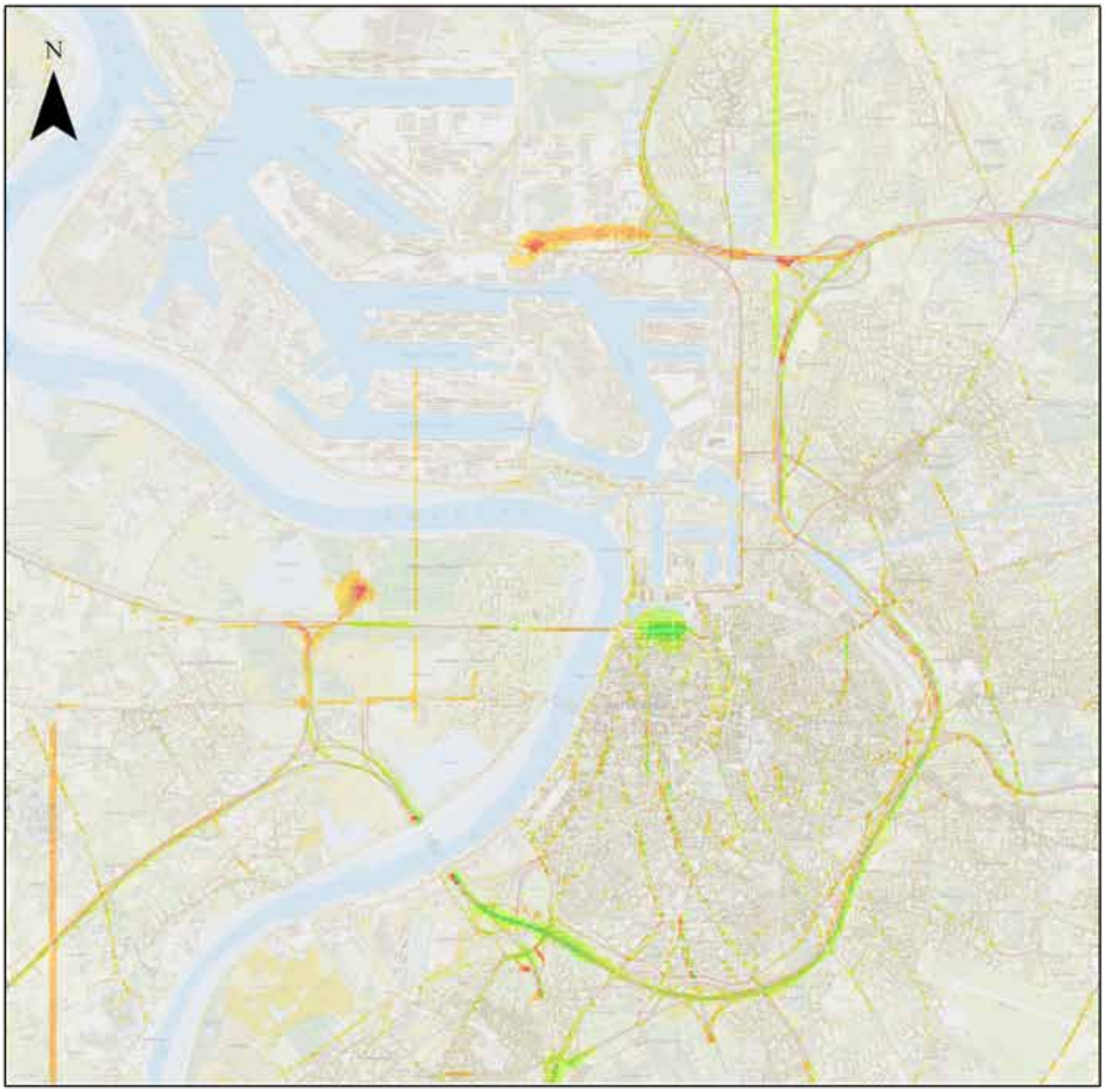
-15 or less | -10 | -5 | -5 to 5 | 5 | 10 | 15 or more

0 0.5 1 2 Km


N
Difference between Do Minimum and T2 2020
Annual Mean PM10
All concentrations in microgrammes per cubic metre
-8 or less
-6
-4
-2
-1
-1 to 1
1
2
4
6
8 or more
0 0.5 1 2 Km


N
Difference between Do Minimum and T2 2020
Annual Mean PM2.5
All concentrations in microgrammes per cubic metre
-15 or less
-10
-5
-1
-1 to 1
1
5
10
>15
0 0.5 1 2 Km

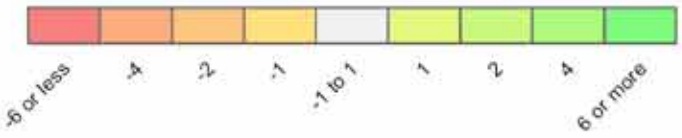

N
Difference between Do Minimum and T2 2020
Hourly Mean (99.79th Percentile) NO2
All concentrations in microgrammes per cubic metre
-80 or less
-60
-40
-20
-10
-10 to 10
10
20
40
60
80 or more
0 0.5 1 2 Km

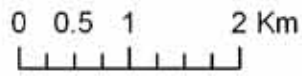


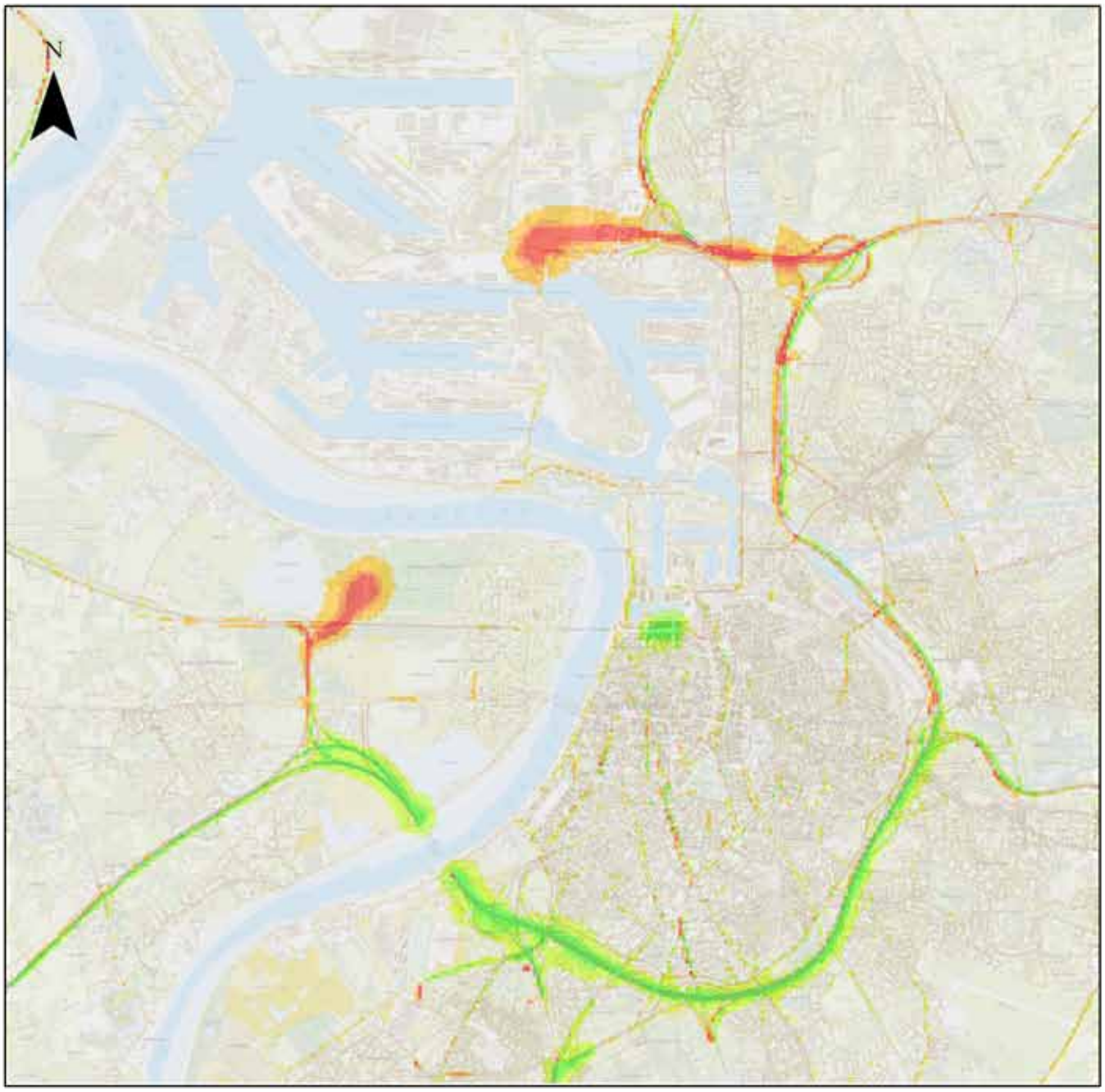
Difference between Do Minimum and T3 2020

Daily Mean (90.41st Percentile) PM10

All concentrations in microgrammes per cubic metre







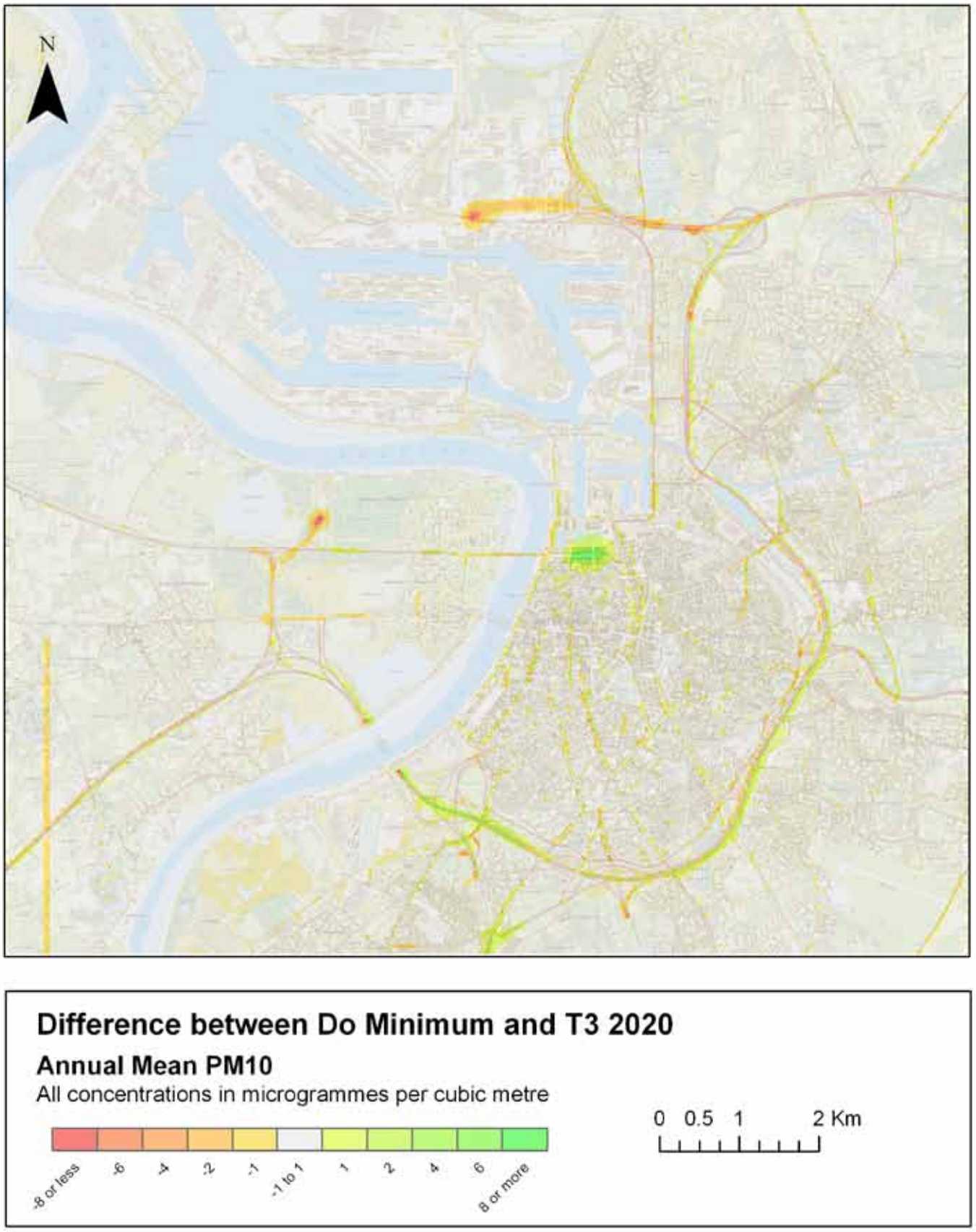
Difference between Do Minimum and T3 2020

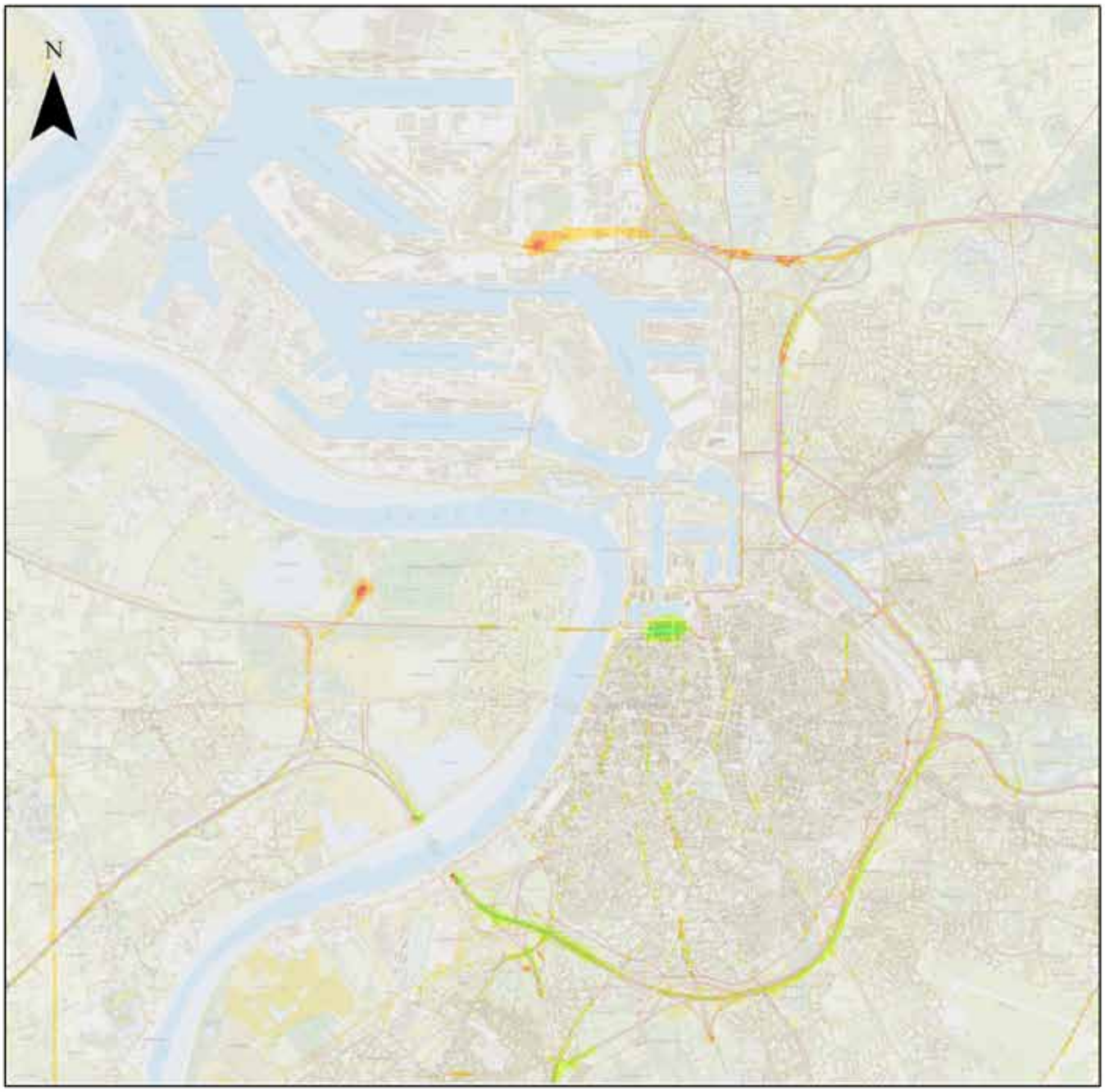
Annual Mean NO2

All concentrations in microgrammes per cubic metre

-15 or less | -10 | -5 | -5 to 5 | 5 | 10 | 15 or more

0 0.5 1 2 Km

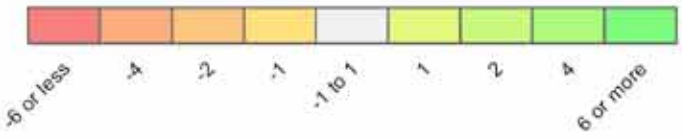

N
Difference between Do Minimum and T3 2020
Annual Mean PM10
All concentrations in microgrammes per cubic metre
-8 or less
-6
-4
-2
-1
-1 to 1
1
2
4
6
8 or more
0 0.5 1 2 Km

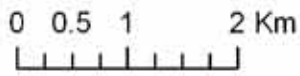


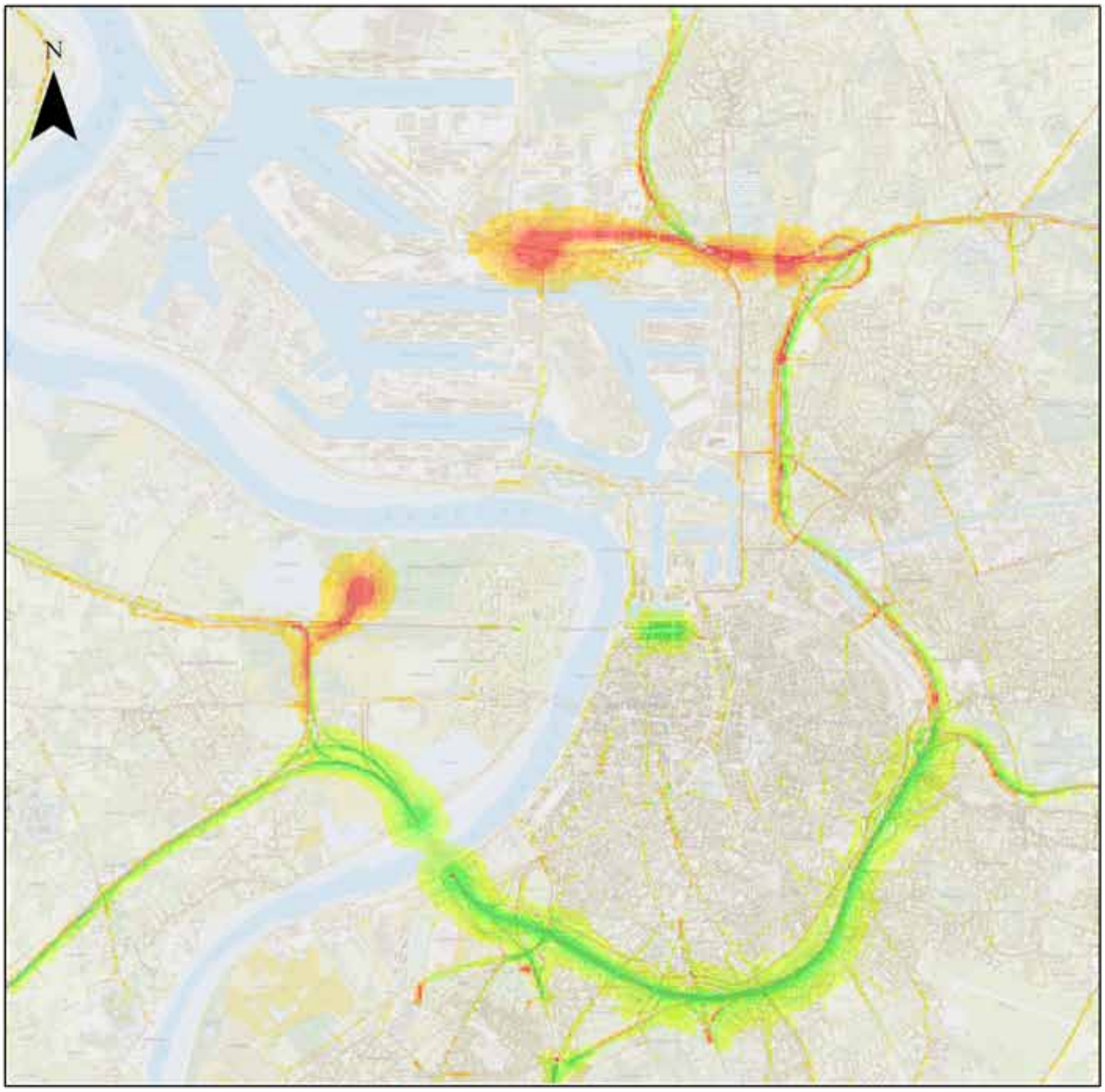
Difference between Do Minimum and T3 2020

Annual Mean PM2.5

All concentrations in microgrammes per cubic metre



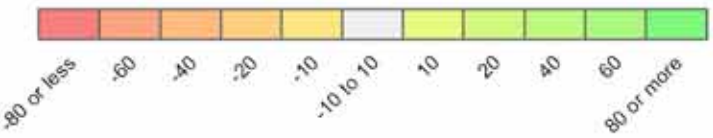


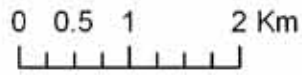


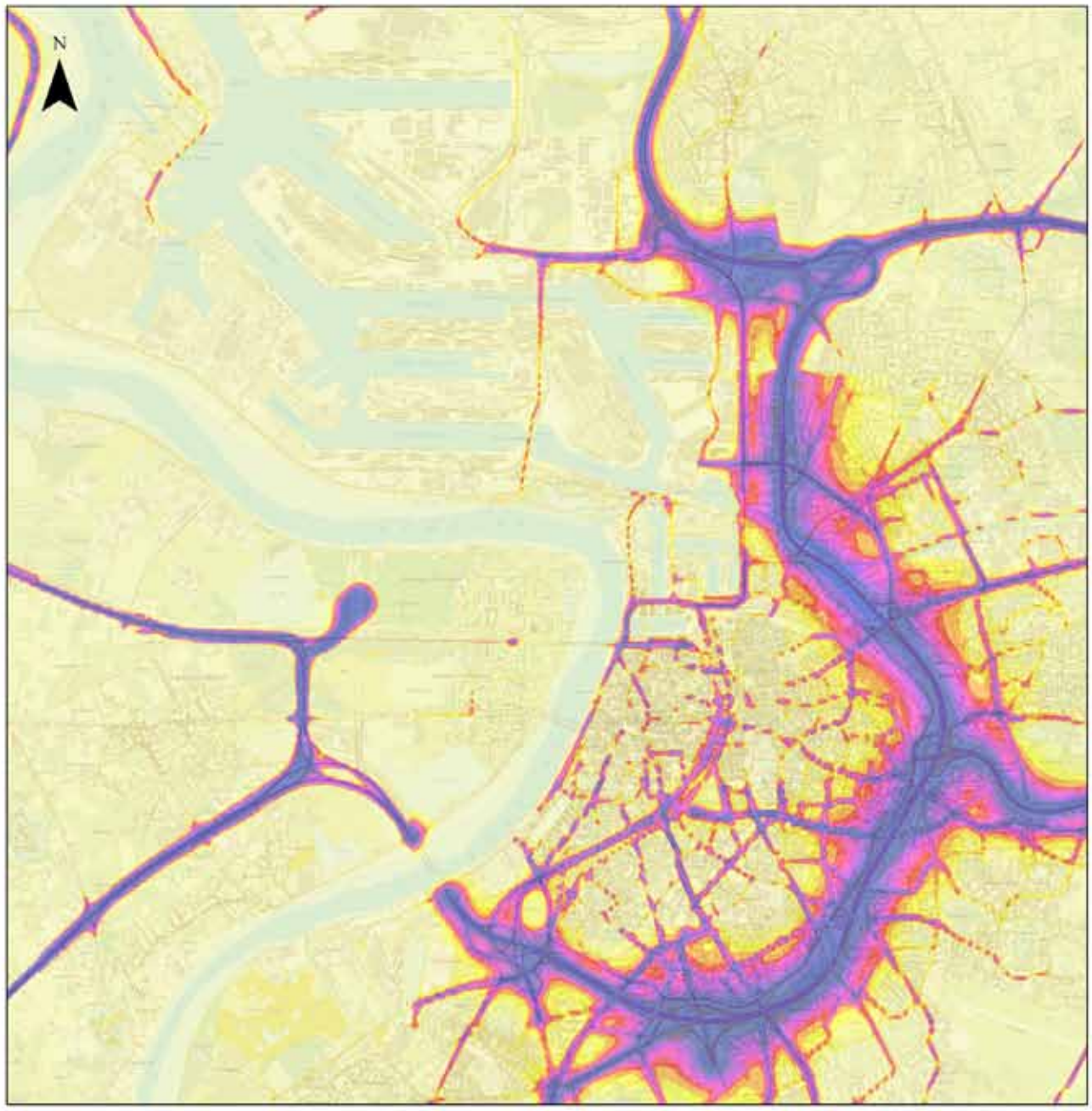
Difference between Do Minimum and T3 2020

Hourly Mean (99.79th Percentile) NO2

All concentrations in microgrammes per cubic metre






N
T2 2020
Annual Mean NO2
All concentrations in microgrammes per cubic metre
<38
38 - 39
39 - 40
40 - 41
41 - 42
42 - 44
44 - 46
46 - 50
>50
0 0.5 1 2 Km

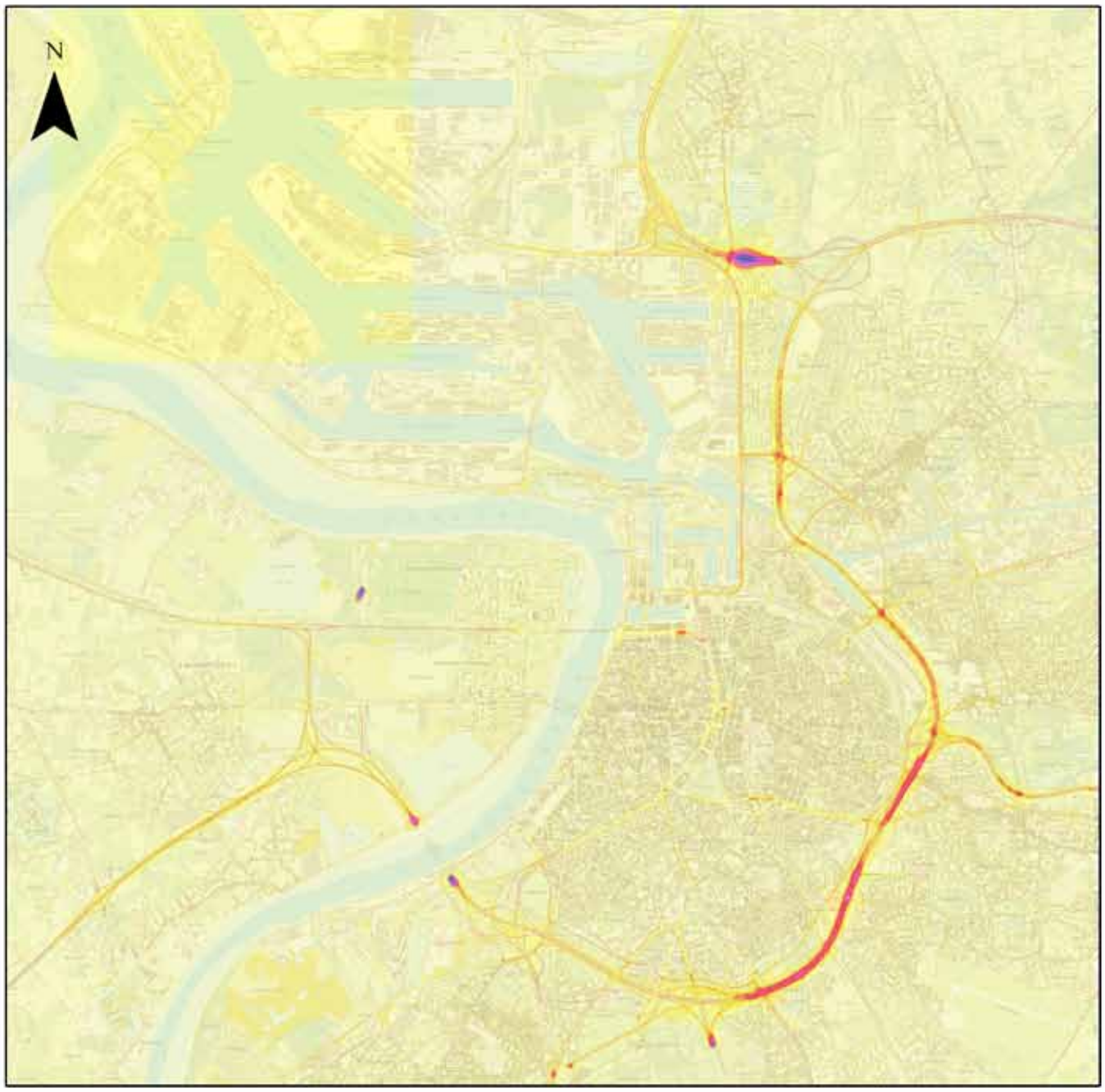
T2 2020

Annual Mean PM10

All concentrations in microgrammes per cubic metre

<34
34 - 38
38 - 40
40 - 41
41 - 42
42 - 44
44 - 46
46 - 48
>48

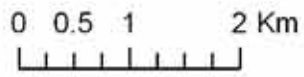
0 0.5 1 2 Km

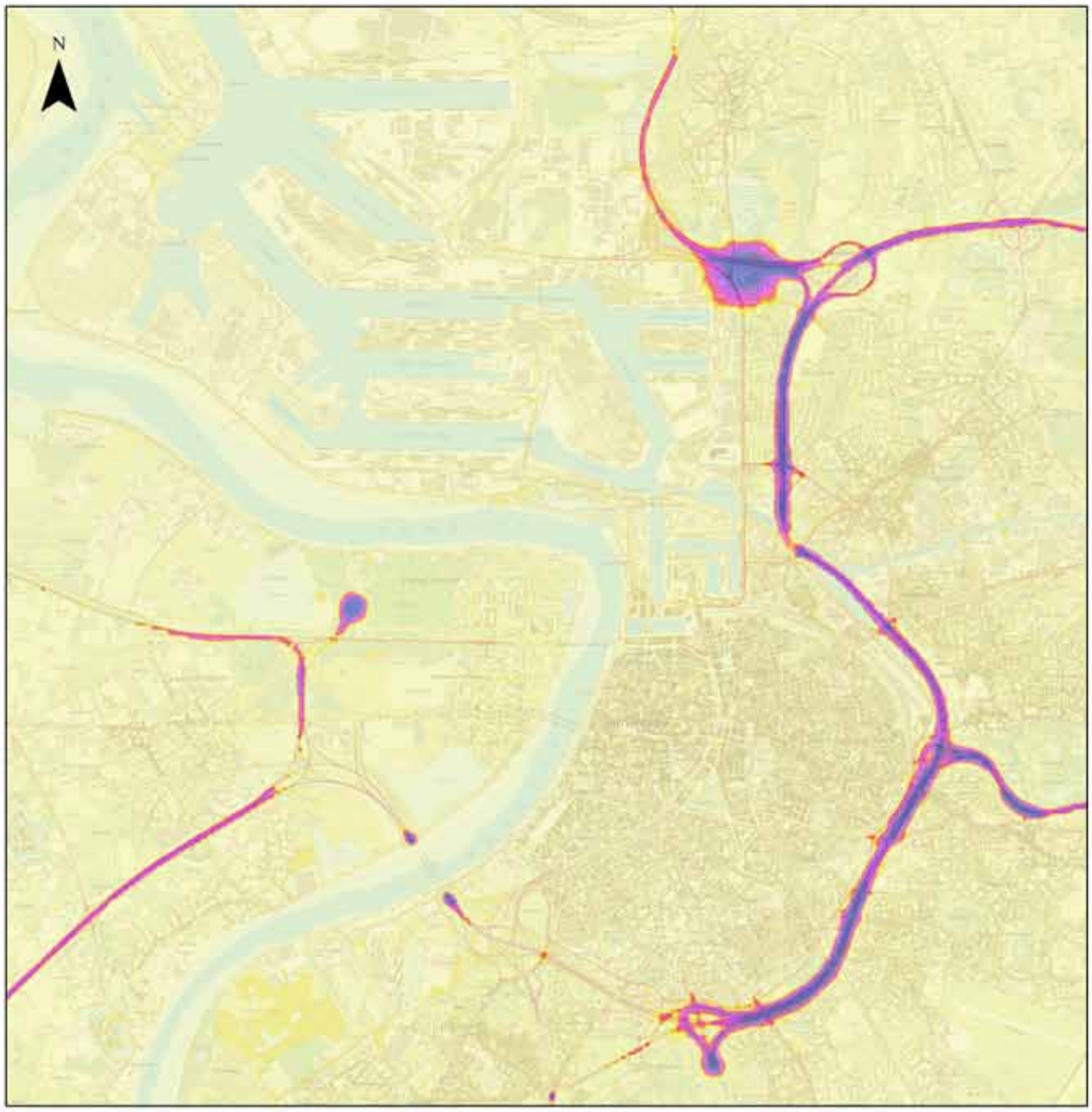


T2 2020

Annual Mean PM2.5

All concentrations in microgrammes per cubic metre

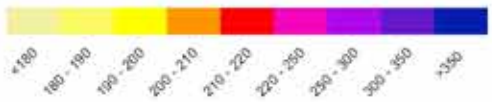


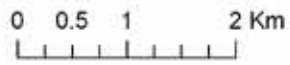


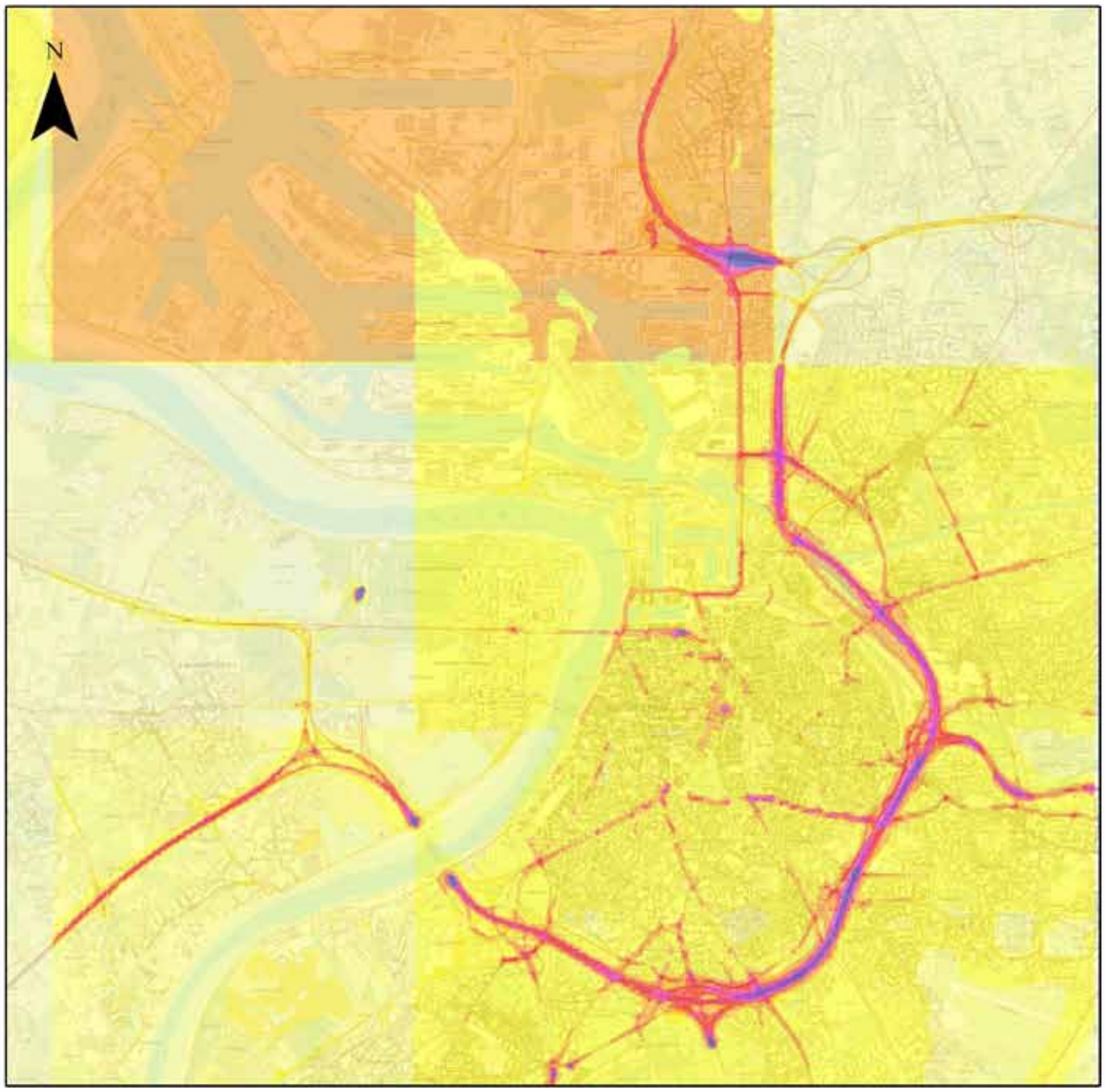
T2 2020

Hourly Mean (99.79th Percentile) NO2

All concentrations in microgrammes per cubic metre



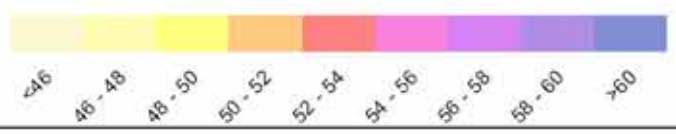


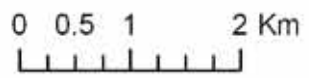


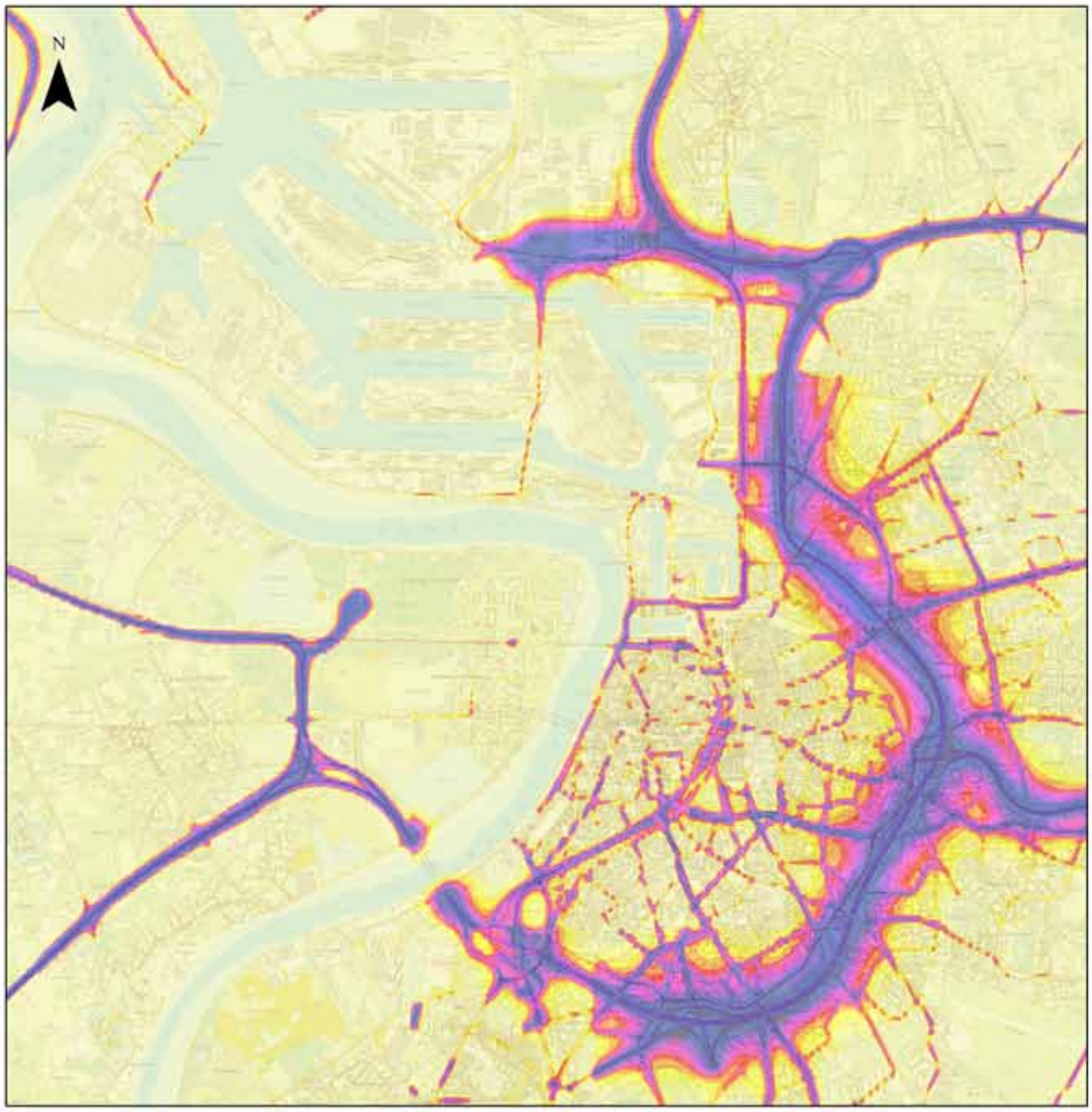
T2 2020

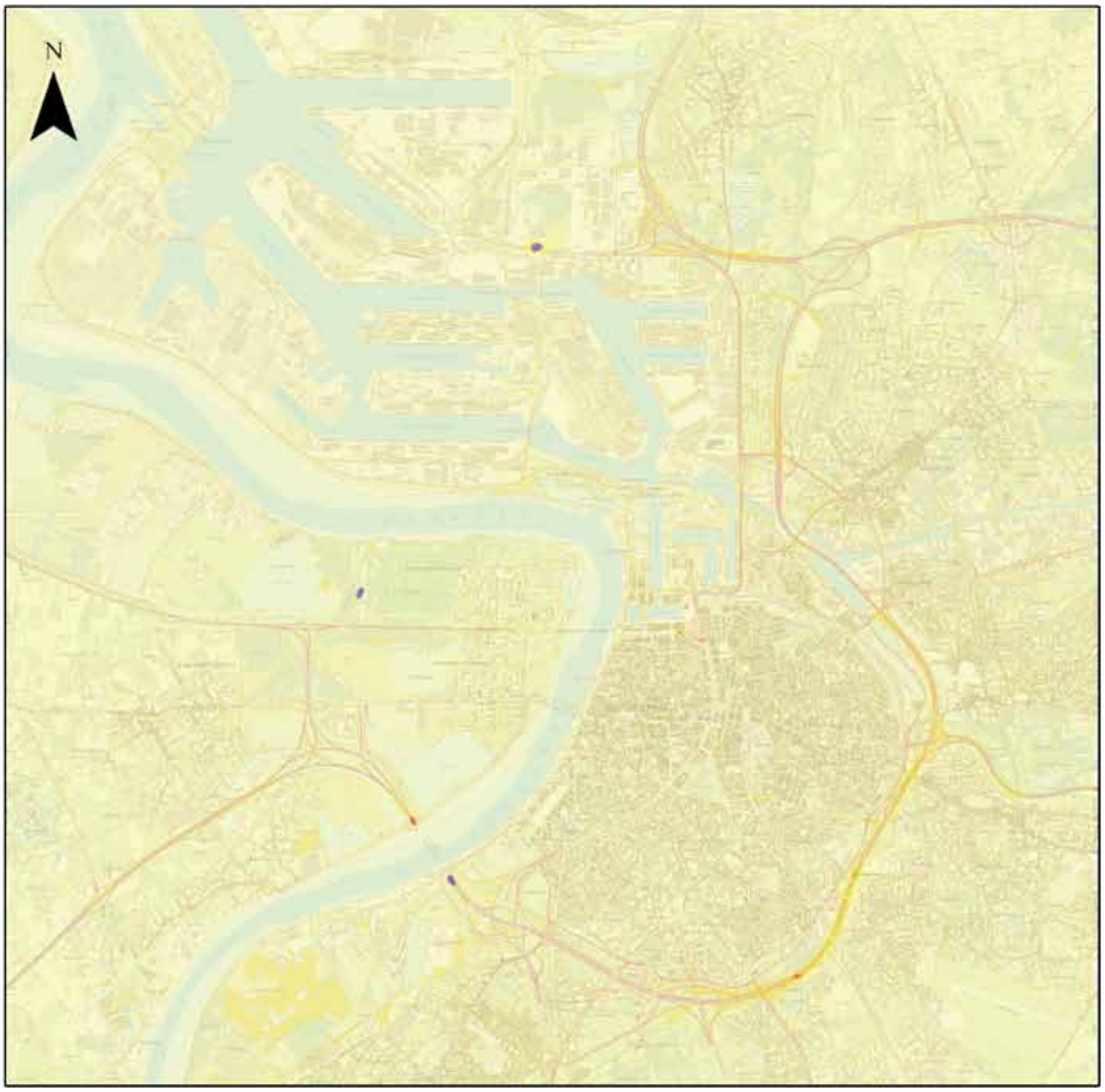
Daily Mean (90.41st Percentile) PM10

All concentrations in microgrammes per cubic metre





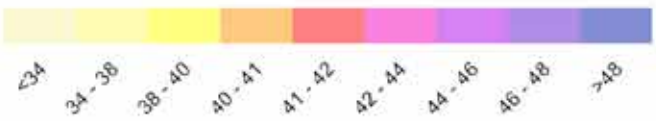

N
T3 2020
Annual Mean NO2
All concentrations in microgrammes per cubic metre
<38
38 - 39
39 - 40
40 - 41
41 - 42
42 - 44
44 - 46
46 - 50
>50
0 0.5 1 2 Km

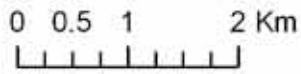


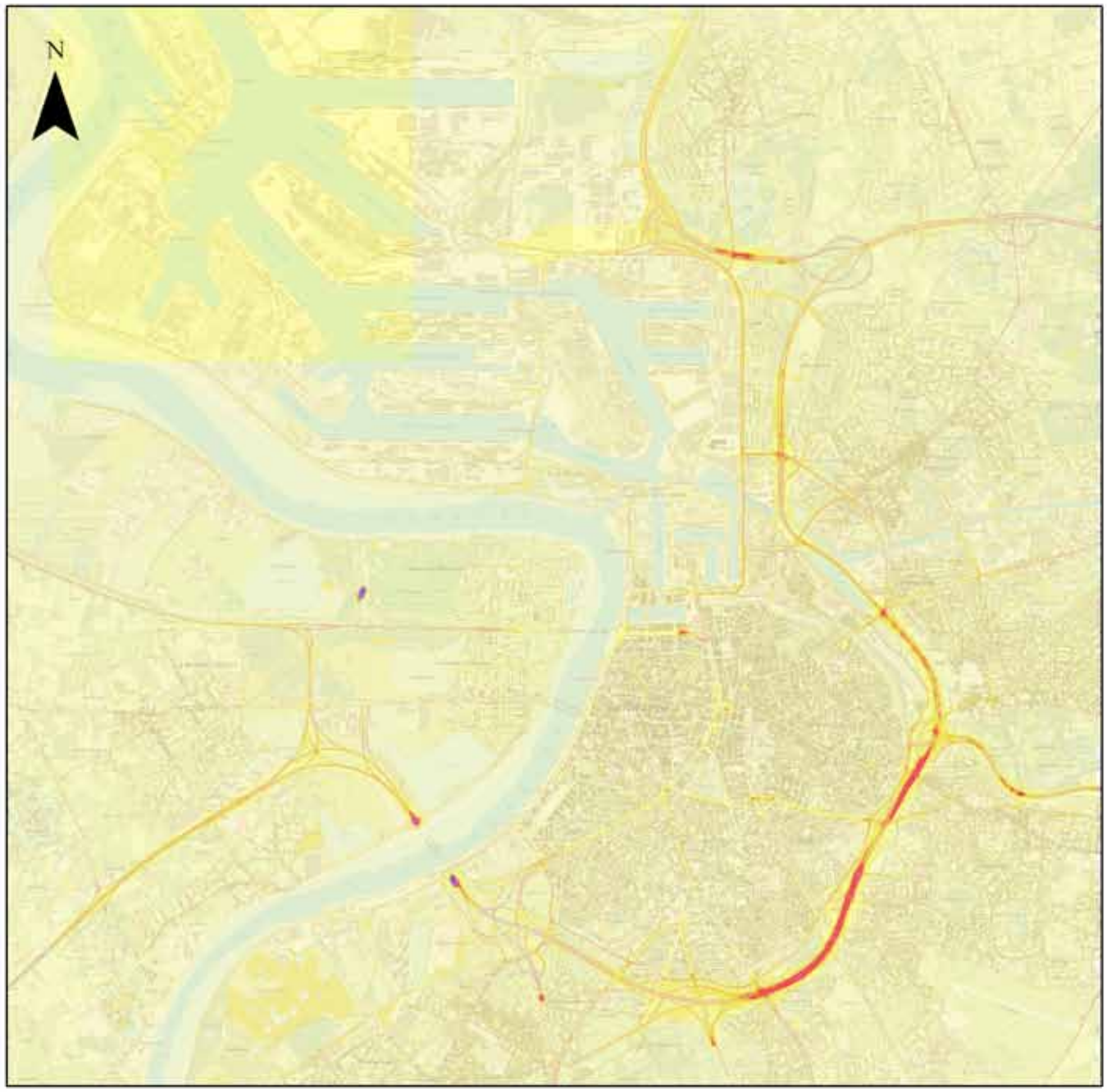
T3 2020

Annual Mean PM10

All concentrations in microgrammes per cubic metre



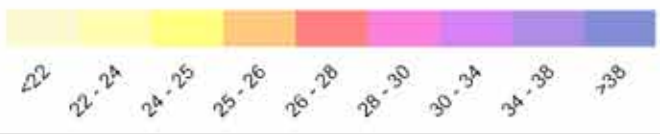


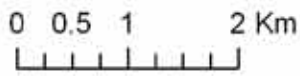


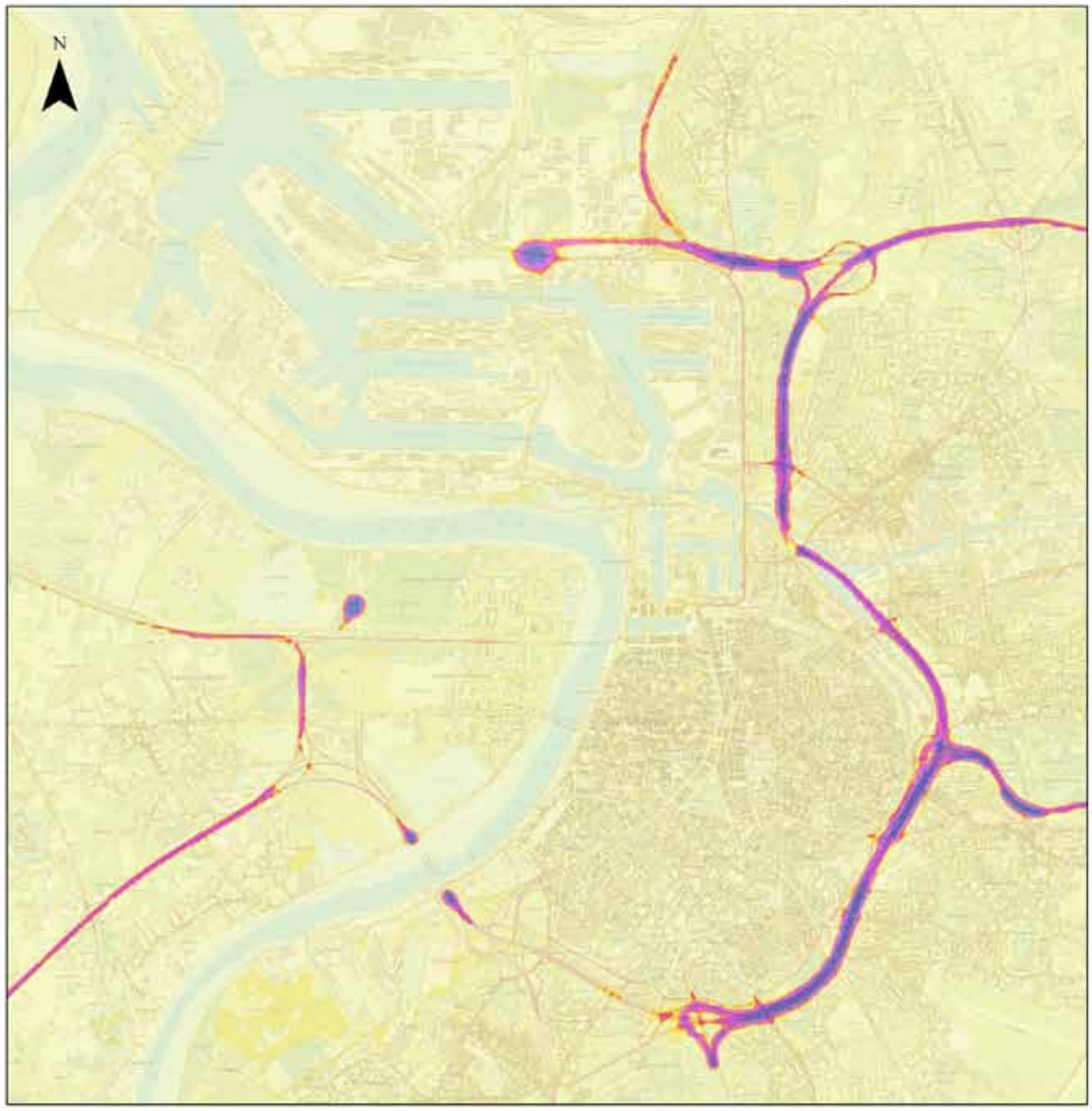
T3 2020

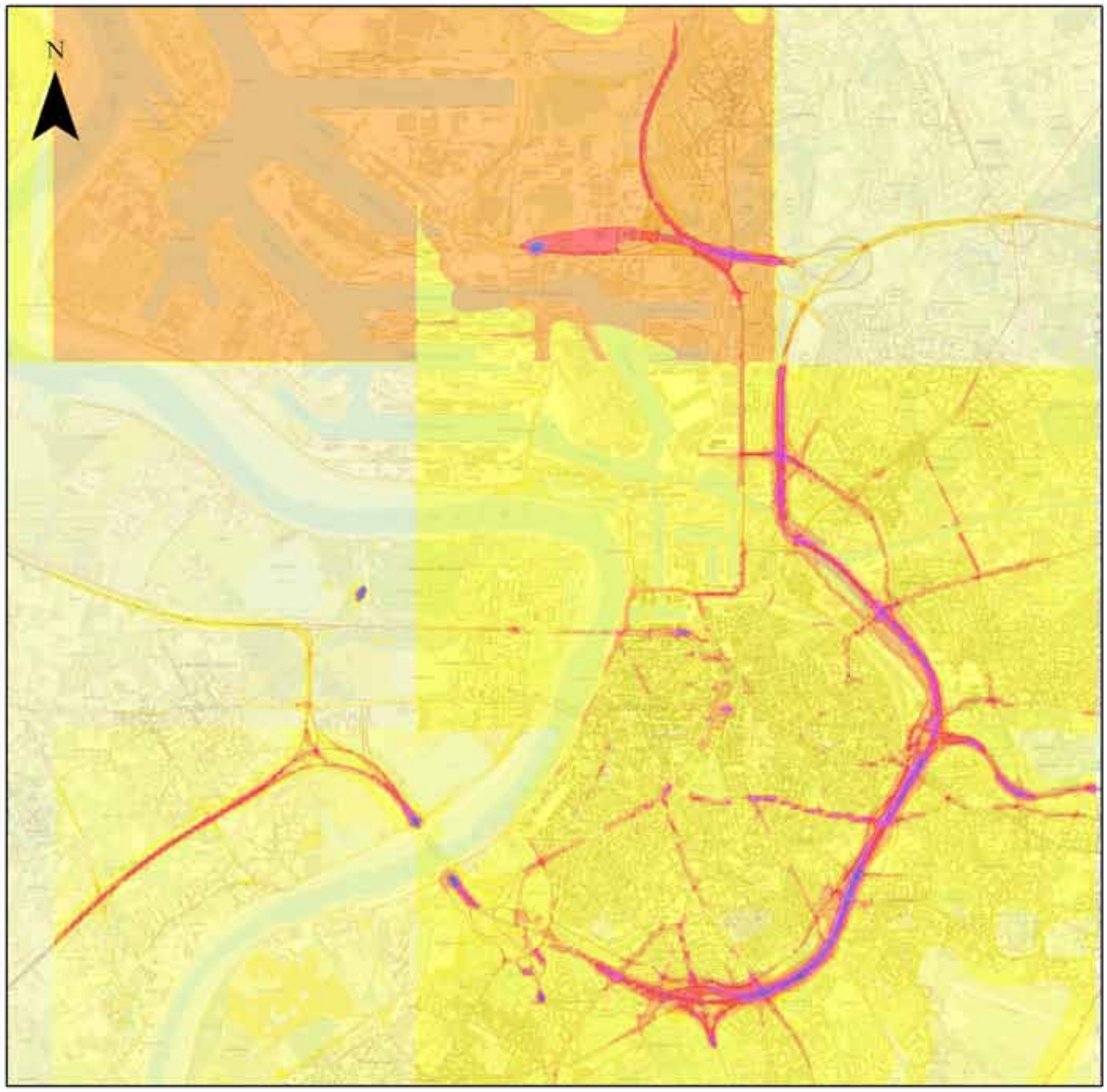
Annual Mean PM2.5

All concentrations in microgrammes per cubic metre





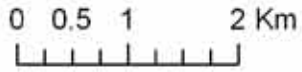

N
T3 2020
Hourly Mean (99.79th Percentile) NO2
All concentrations in microgrammes per cubic metre
<180
180 - 190
190 - 200
200 - 210
210 - 220
220 - 250
250 - 300
300 - 350
>350
0 0.5 1 2 Km

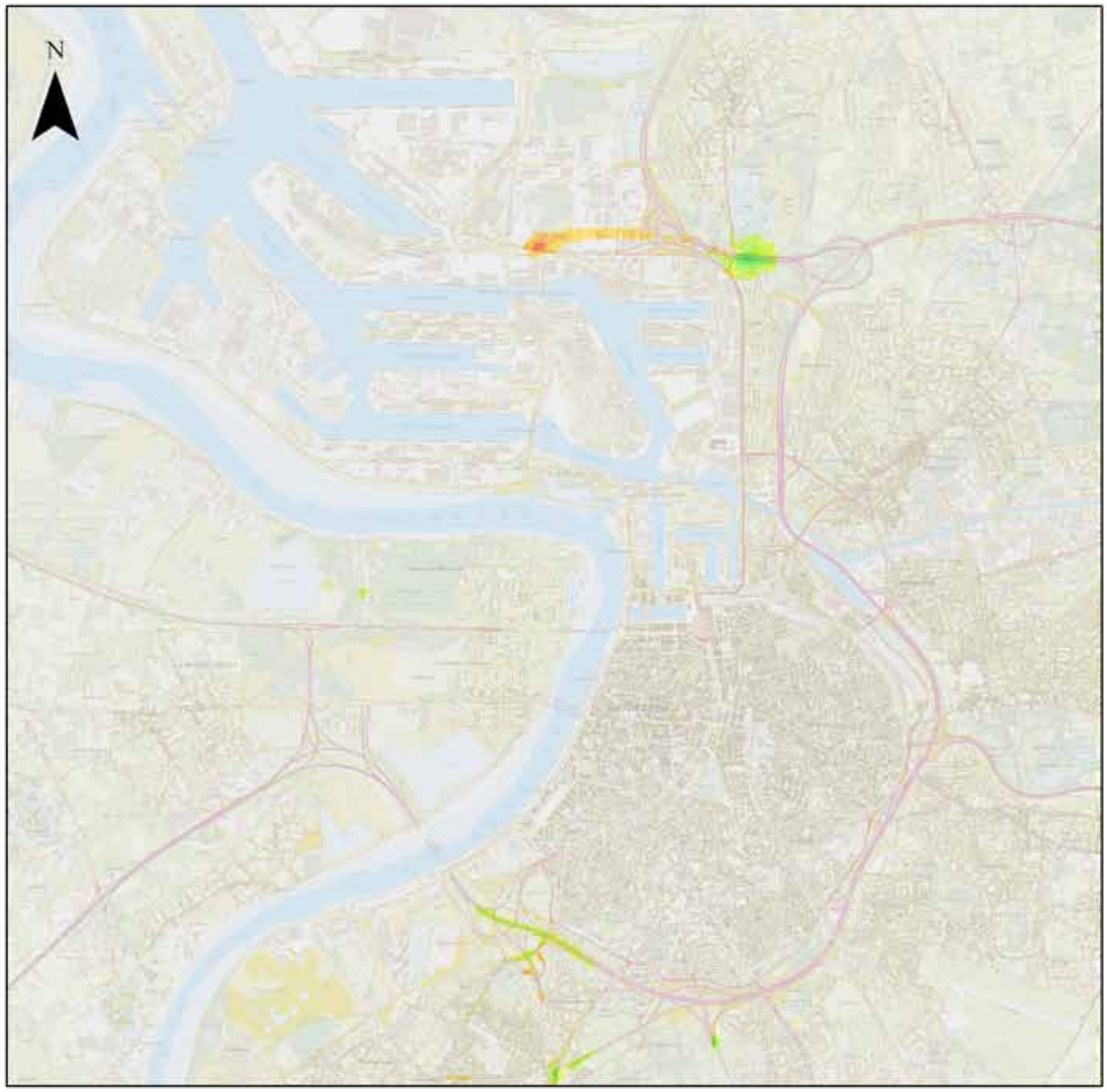


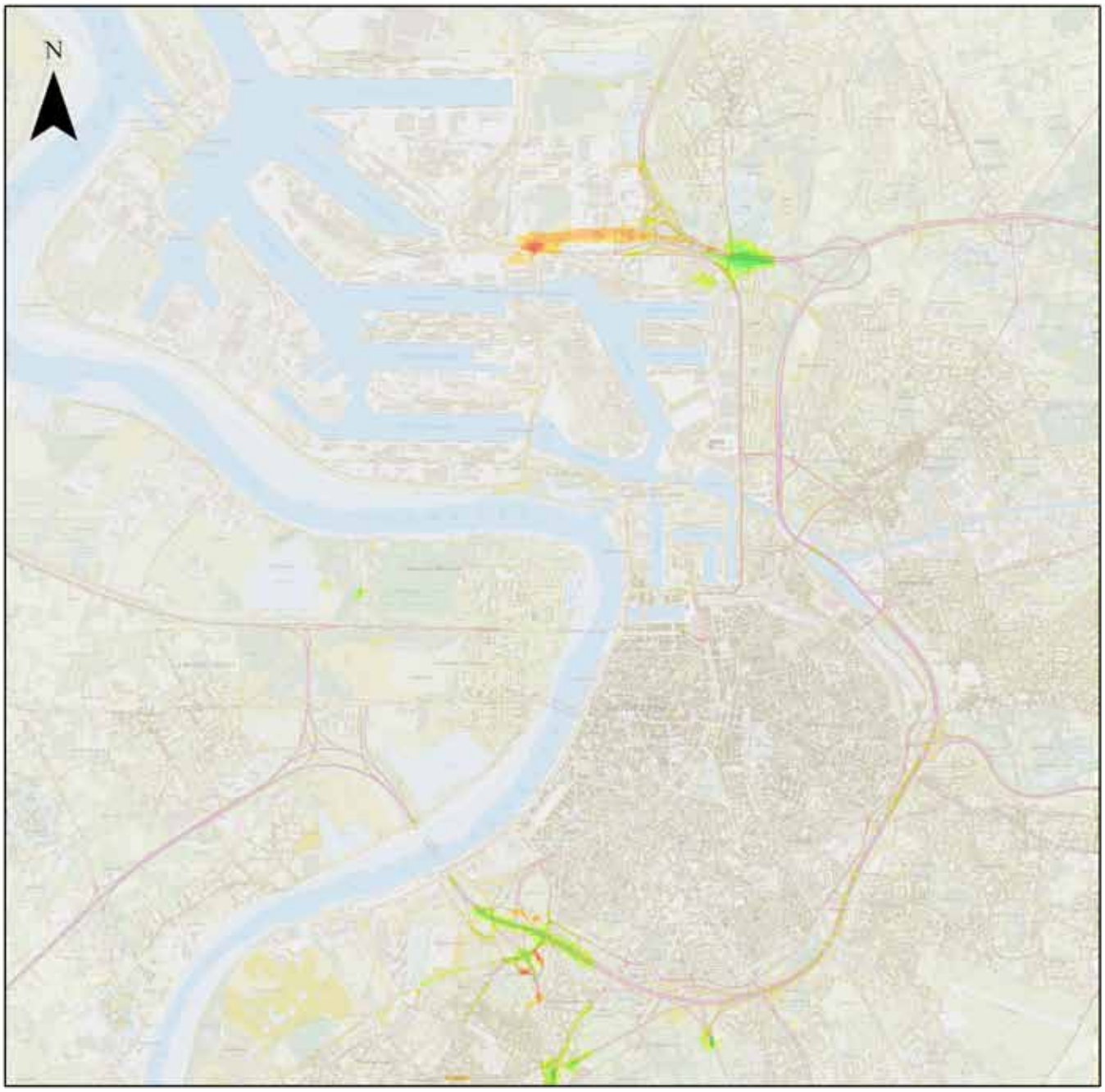
T3 2020

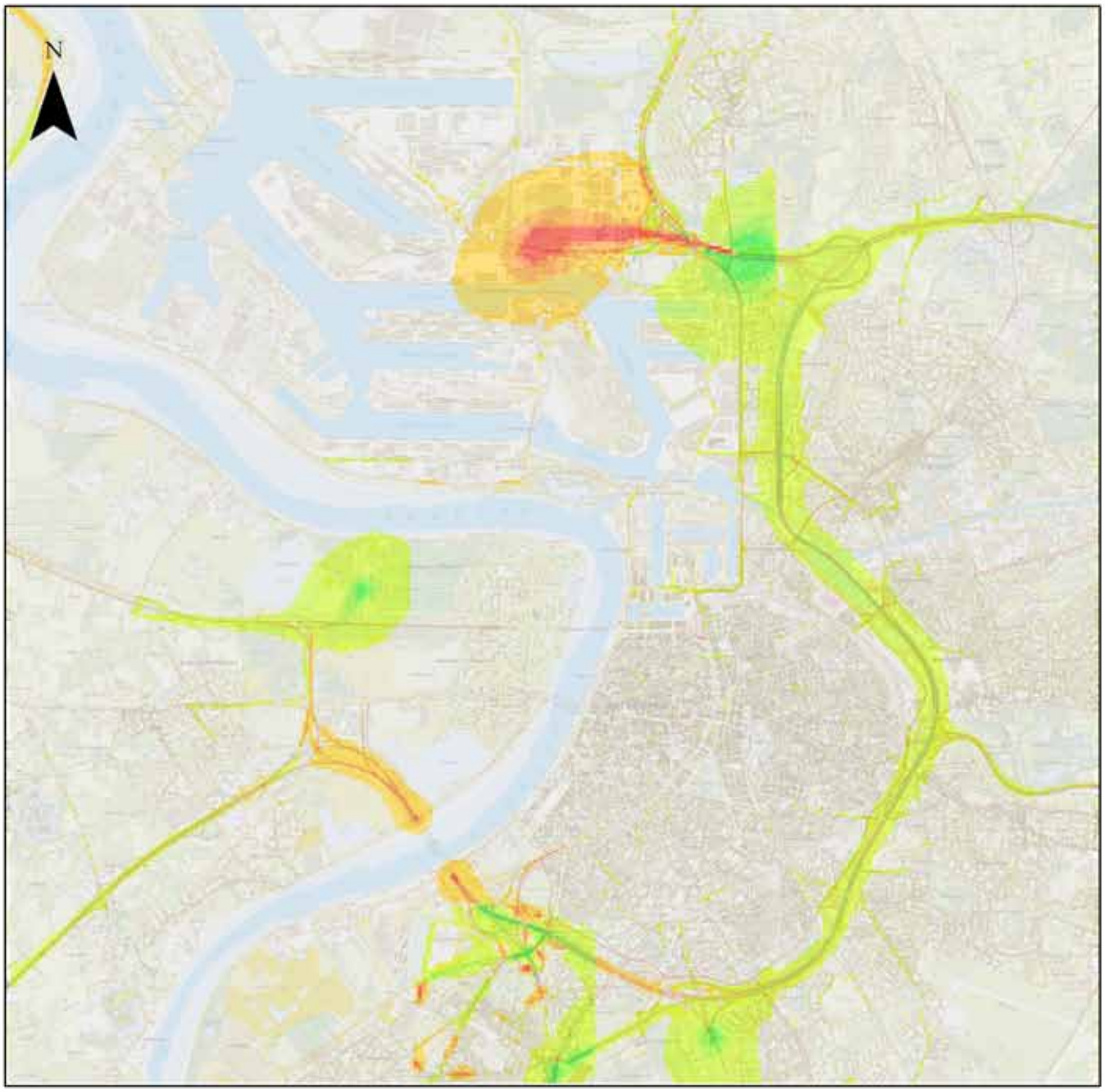
Daily Mean (90.41st Percentile) PM10

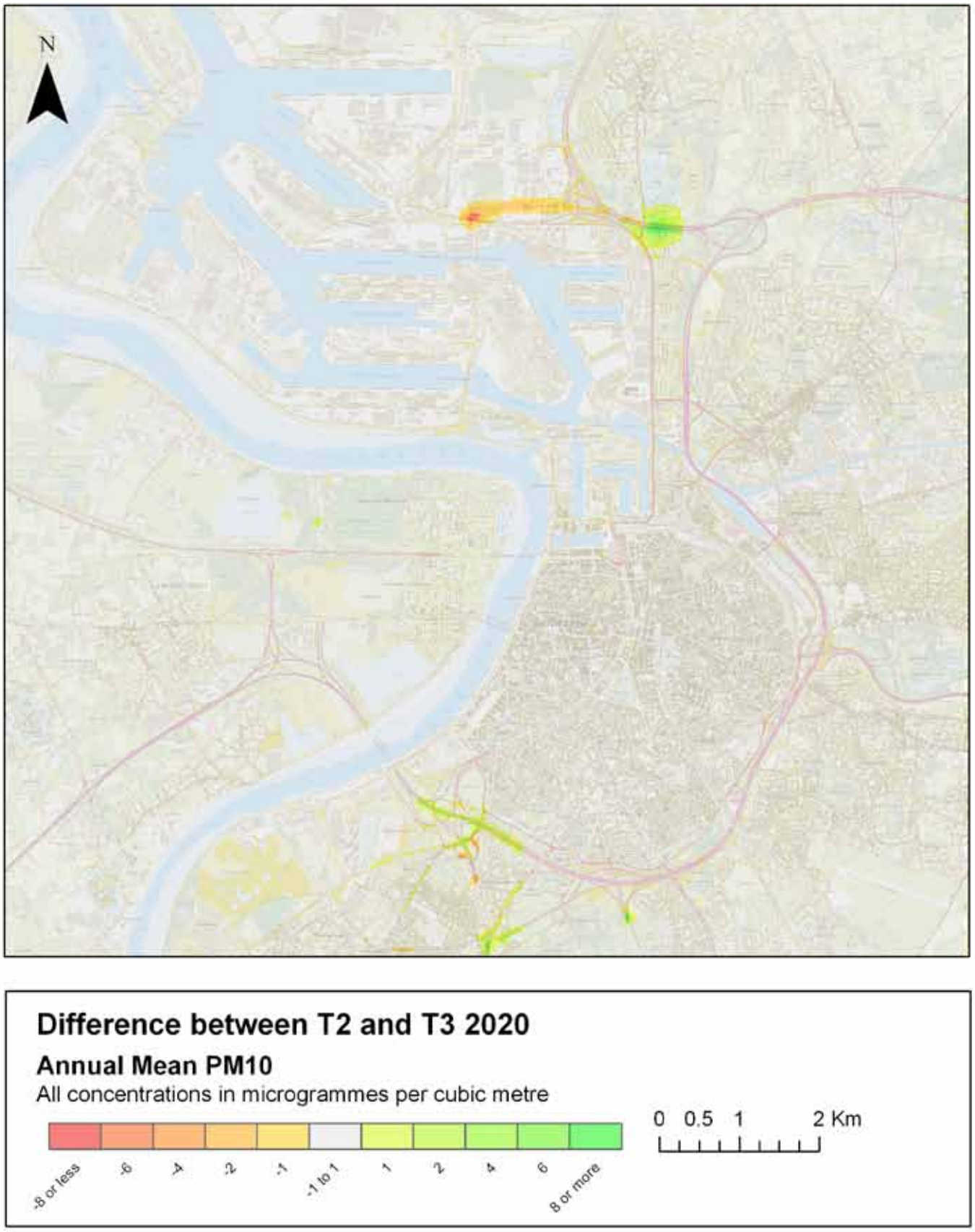
All concentrations in microgrammes per cubic metre

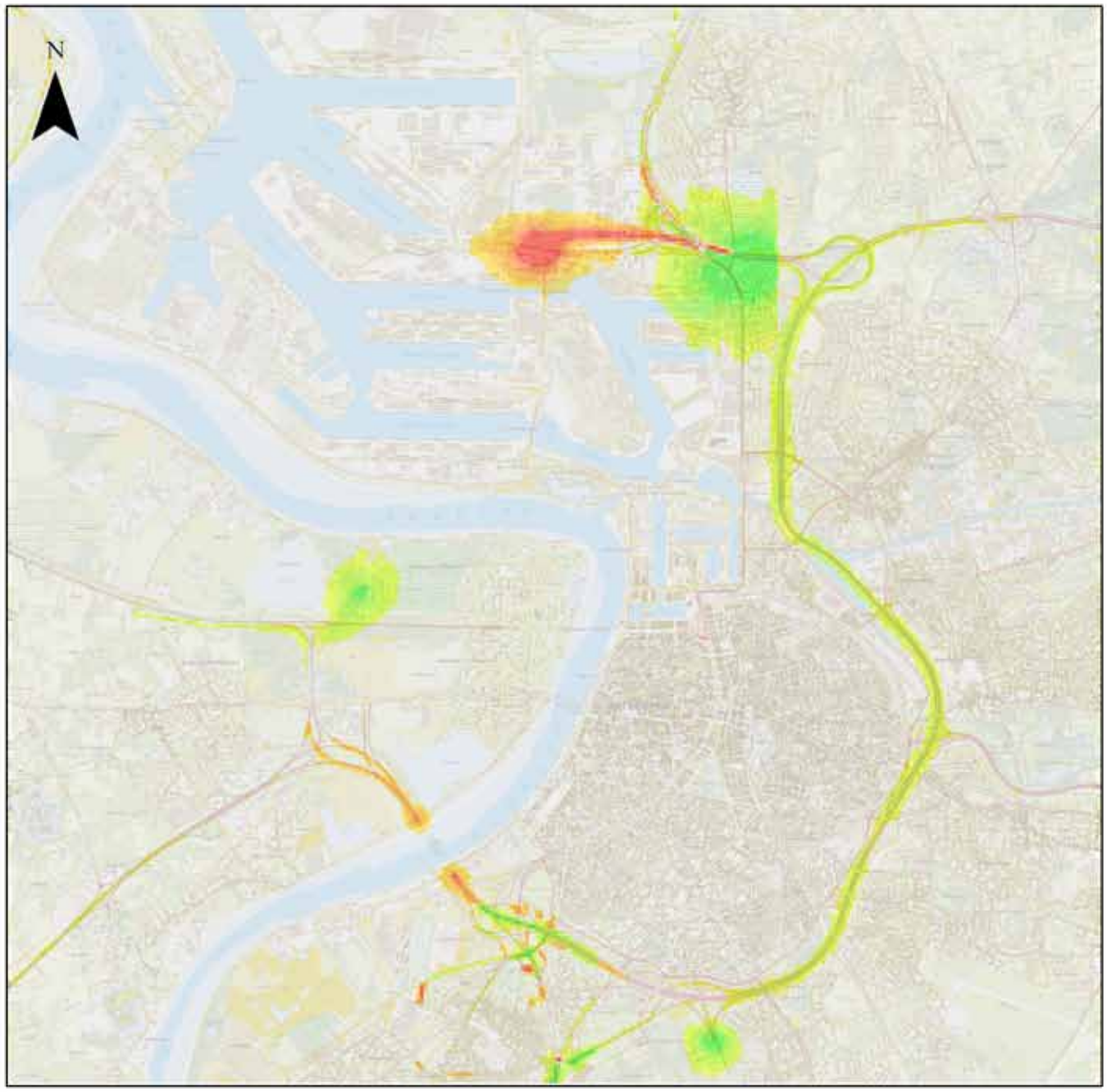



N
Difference between T2 and T3 2020
Annual Mean PM2.5
All concentrations in microgrammes per cubic metre
-6 or less
-4
-2
-1
-1 to 1
1
2
4
6 or more
0 0.5 1 2 Km


N
Difference between T2 and T3 2020
Daily Mean (90.41st Percentile) PM10
All concentrations in microgrammes per cubic metre
-6 or less
-4
-2
-1
-1 to 1
1
2
4
6 or more
0 0.5 1 2 Km


N
Difference between T2 and T3 2020
Annual Mean NO2
All concentrations in microgrammes per cubic metre
-15 or less
-10
-5
-1
-1 to 1
1
5
10
15 or more
0 0.5 1 2 Km


N
Difference between T2 and T3 2020
Annual Mean PM10
All concentrations in microgrammes per cubic metre
-8 or less
-6
-4
-2
-1
-1 to 1
1
2
4
6
8 or more
0 0.5 1 2 Km


N
Difference between T2 and T3 2020
Hourly Mean (99.79th Percentile) NO2
All concentrations in microgrammes per cubic metre
-80 or less
-60
-40
-20
-10
-10 to 10
10
20
40
60
80 or more
0 0.5 1 2 Km

A16
FINANCIELE INDICATOREN

4. FINANCIËLE INDICATOREN

4.1 TOELICHTING FINANCIEEL MODEL

4.1.1. Inleiding

Een belangrijk uitgangspunt is dat de realisatie van het project "Oosterweelverbinding" zou plaatsvinden bij wijze van een DBfM-structuur. Naast het ontwerp ("D" van design) en de bouw ("B" van build) wordt van de aannemer verlangd dat hij instaat voor een deel van de financiering ("F" van finance) en voor het onderhoud ("M" van Maintenance).

Voor de uitvoering van het DBfM contract zou een specifieke projectvennootschap (ook "SPV" Special Purpose Vehicle genoemd) worden opgericht door het consortium dat in opdracht van de opdrachtgever (BAM) het project zou realiseren.

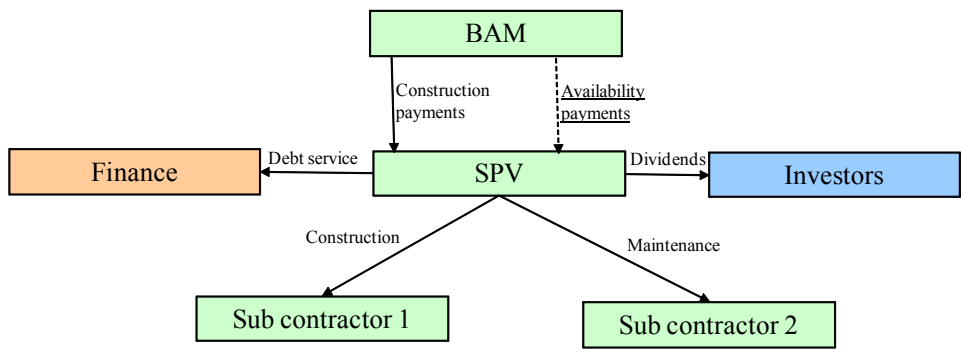
De kenmerken van deze DBfM structuur zijn in grote lijnen de volgende:

- De DBfM structuur wordt aangegaan voor een lange termijn, die opgesplitst kan worden in een constructieperiode en een exploitatieperiode. De constructieperiode duurt, afhankelijk van het gekozen scenario, vier tot zes jaar. De exploitatieperiode duurt vijfendertig jaar;
- De SPV staat niet enkel in voor de goede uitvoering van de werken, maar ook voor de kwaliteit van de infrastructuur gedurende de ganse contractperiode;
- De vergoedingen die de SPV ontvangt voor de geleverde prestaties worden opgesplitst in:
  - Mijlpaalvergoedingen die tijdens de constructieperiode betaald worden door de opdrachtgever tot 80 % van de investeringskosten. De resterende 20 % wordt betaald gespreid over de overeengekomen exploitatieperiode. Deze vergoedingen worden verder "Construction Payments" genoemd;
  - Beschikbaarheidsvergoedingen die tijdens de exploitatieperiode door de opdrachtgever betaald worden aan de SPV. Deze vergoedingen worden verder "Availability Payments" genoemd.

Bij de opbouw van het financieel model wordt een basis PPS-structuur gemodelleerd, met in hoofdzaak twee hoofdentiteiten. Ter vereenvoudiging van de terminologie hebben we deze entiteiten enerzijds "BAM" (Opdrachtgever) genoemd en de tweede partij "SPV" (Aannemer).

Het schematisch model van de werking tussen deze twee entiteiten kan als volgt worden weergegeven:

a) *Vanuit het standpunt van de "SPV"-entiteit*



Een consortium van (privé-) investeerders ("Investors") zal een SPV oprichten ten behoeve van het project en zal hiervoor een bepaalde kapitaalsinbreng voorzien. Uiteraard zullen deze investeerders een bepaald rendement op hun investering (ingebracht kapitaal) willen realiseren.

De SPV zal de realisatie van de bouw van de infrastructuur op zich nemen, alsook het onderhoud tijdens de exploitatieperiode.

Voor de concrete invulling van de realisatie van de bouw van de infrastructuur ("Construction") en/of het onderhoud van de infrastructuur tijdens de exploitatieperiode, kan de SPV een beroep doen op onderaannemers (Sub contractor).

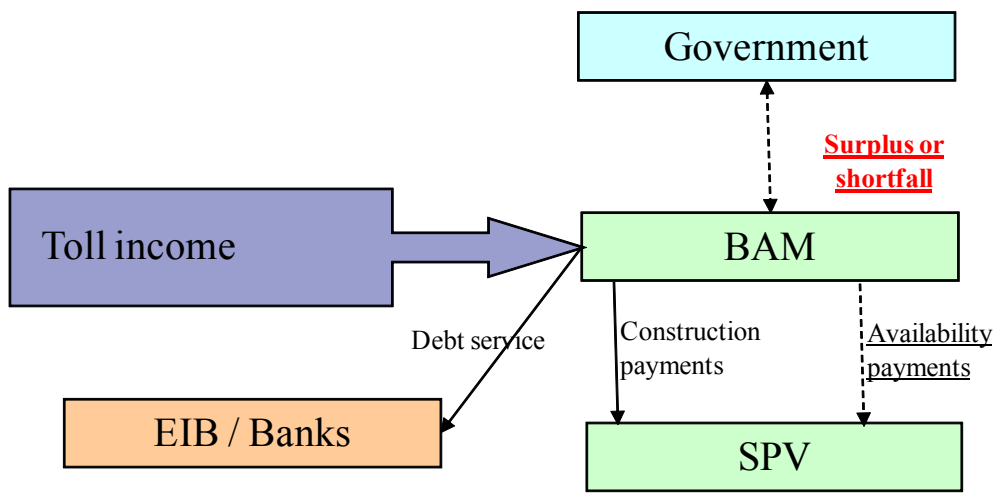
De inkomsten van de SPV bestaan uit de Construction Payments en de Availability Payments die de SPV aan de BAM-entiteit kan factureren.

Voor de financiering van zijn werking zal de SPV, naast haar eigen middelen, een beroep doen op vreemd vermogen (bij banken).

Het financieel model is erop gebouwd dat de laagst mogelijke Availability Payment wordt berekend in de SPV, rekening houdend met:

- De verkregen inkomsten op basis van de "Construction Payments";
- Betaling van alle kosten van de SPV; met name de investeringskost en de exploitatiekosten van de infrastructuur;
- Tegemoetkomen aan alle verplichtingen bij de banken: terugbetalen van vreemd vermogen en voldoen aan de voorwaarden (covenants) waarop dat vreemd vermogen beschikbaar werd gesteld;
- Een vooropgesteld doel rendement behalen voor de investeerders (15 % op hun kapitaal binnen de SPV).

b) *Vanuit het standpunt van de entiteit ''BAM''*



De BAM-entiteit heeft de opdracht voor de realisatie en exploitatie van de infrastructuur verleend aan de SPV en betaalt hiervoor de Construction Payments en Availability Payments aan de SPV.

De BAM-entiteit verwerft de tolinkomsten die tijdens de exploitatieperiode ontstaan door het gebruik van de infrastructuur.

Hier worden enkel kosten en opbrengsten m.b.t. het Oosterweel project opgenomen (stand alone). Met mogelijke kosten en opbrengsten van andere projecten binnen het Masterplan wordt geen rekening gehouden.

Voor zijn financiering zal de BAM-entiteit tevens een beroep doen op vreemd vermogen; deels via de Europese Investeringsbank die een principiële goedkeuring heeft verleend ten belope van 700 mio. EUR, deels via een klassieke bankfinanciering (''senior debt'').

Het financieel model berekent het (jaarlijkse) overschot voor de aandeelhouder van BAM, rekening houdend met:

- Betaling van de Construction en Availability Payments aan de SPV;
- Tegemoetkomen aan alle verplichtingen bij de banken: terugbetalen van vreemd vermogen en voldoen aan de voorwaarden (covenants) waarop dat vreemd vermogen beschikbaar werd gesteld.

4.1.2. SPV-Niveau

4.1.2.1. SPV Resultaten rekening/cashflow

Omzet

De inkomsten van de SPV bestaan uit twee soorten vergoedingen:

Availability Payments: zijnde de bedragen die de SPV gedurende de exploitatieperiode zal factureren aan de opdrachtgever/BAM voor het beschikbaar stellen (en onderhouden) van de infrastructuur;

Construction Payments: zijnde de bedragen die de SPV gedurende de constructieperiode zal factureren aan de opdrachtgever/BAM voor het realiseren van de infrastructuur.

In de resultatenrekening van de SPV worden de Construction Payments niet als omzet getoond in de constructieperiode, maar worden deze pas vanaf de exploitatieperiode in het resultaat genomen (lineair verdeeld over de exploitatieperiode).

4.1.2.1.1. Availability Payments

Het model berekent dynamisch het bedrag van de jaarlijkse Availability Payments als uitkomst waarbij de SPV haar gewenste rendement op haar eigen vermogen behaalt.

Dit gewenste rendement wordt uitgedrukt in een Target IRR (Internal Rate of Return) percentage dat bepaald wordt bij de inputparameters (15%) .

De IRR (Internal Rate of Return) wordt berekend op de jaarlijkse kasstromen van het kapitaal en de uitgekeerde dividenden van de SPV. De berekende dividenden zijn bruto dividenden, voor inhouding van roerende voorheffing.

In het model is de mogelijkheid voorzien om te corrigeren op de realiseerbaarheid van de Availability payments. Indien bijvoorbeeld wordt ingeschat dat de beschikbaarheid van de infrastructuur geen 100 % zou bedragen, dan mag de SPV in principe ook geen 100 % doorfactureren aan de opdrachtgever/BAM. Deze inputfactor is de "Percentage availability achieved".

4.1.2.1.2. Construction payments

Tijdens de constructie periode zal de SPV op basis van een vooraf bepaald percentage volgens DBfM-contract, een gedeelte van zijn kosten doorfactureren aan de opdrachtgever/BAM.

Dit percentage is een inputvariabele in het model, maar werd ingezet op 80 %.

Het saldo (20 %) van de gemaakte kosten wordt door de SPV aangerekend aan de opdrachtgever als deel van de Availability Payments.

In principe zullen de Construction Payments gebaseerd worden op bepaalde mijlpalen en/of opleveringsmomenten volgens de bepalingen in het DBfM contract. In het model werd een vereenvoudiging doorgevoerd door de Construction Payments te berekenen in de periodes waar de investeringen (CAPEX; Capital Expenditure) plaatsvindt.

Operationele kosten

- De operationele kosten (operating expenses) voor de SPV bestaan uit de kosten voor het onderhouden van de infrastructuur. De operationele kosten die tijdens de constructie periode worden gemaakt, maken deel uit van de investering en worden gekapitaliseerd.
- De ontwikkelingskosten (development costs) die in de constructieperiode worden uitgegeven, worden bij de Capital Expenditure gevoegd.

Deze kosten kunnen met een sensitiviteitsfactor evt. bijgesteld worden.

Deze kosten worden geïndexeerd met een vooropgesteld percentage (eventueel verhoogd met een sensitiviteit).

Kosten infrastructuur

De investeringskosten worden als (toe te wijzen) kosten ten laste van het resultaat genomen analoog met lineaire afschrijvingen, verspreid over de exploitatieperiode.

Intresten

De intresten in de SPV hebben betrekking op twee posten:

- De intresten komende uit de financiering met vreemd vermogen (senior debt). De intrest wordt berekend:
  - op het gemiddeld uitstaande bedrag per jaar van het vreemd vermogen;
  - op basis van vooropgestelde intrestvoet (eventueel aangepast met een sensitiviteitsfactor).
- De intresten op de kasoverschot (cash balance) of kastekorten (cash overdraft). Het basisbedrag van de kaspositie blijkt uit de balans; waarbij het gemiddelde wordt gemaakt van de begin- en eindbalanspositie. Een verschillende intrestvoet wordt toegepast naargelang het een overschot of een tekort betreft.

De intresten worden in het model dynamisch berekend bij het uitvoeren van de Availability Payments optimalisatie.

Belastingen

Op het resultaat voor belastingen wordt een vlakke belasting berekend, op basis van een belastingdrukpercentage in de inputfactoren (Tax rate; 34%). Er wordt geen rekening gehouden met eventuele verworpen uitgaven, noch met notionele intrestaftrek of andere fiscale correcties.

Recupereerbare verliezen worden naar volgende periodes verschoven. De te betalen belasting wordt in het volgende jaar in cashflow meegenomen.

4.1.2.2. SPV Financiering

Per periode wordt de financieringsbehoefte berekend (funding requirement).

Deze behoefte houdt rekening met:

- Inkomsten vanuit de Availability Payments;
- Capex;
- Opex;
- Cashflow effecten van debiteuren, crediteuren en BTW;
- Inkomsten uit Construction Payments;
- Intresten en fees gedurende de constructieperiode.

Afhankelijk van de vooropgestelde verhouding kapitaal vs. vreemd vermogen (Gearing), wordt de financieringsbehoefte ingevuld door deze twee categorieën (Equity en Senior Debt).

4.1.2.2.1. Vreemd vermogen (Senior Debt)

Het totaal aan behoefte vreemd vermogen (opgebouwd tijdens de constructieperiode) resulteert in de leningsfaciliteit (Facility).

In de vooropgestelde inputparameters worden de eigenschappen van deze faciliteit gekozen; zijnde:

- Terugbetalingmodaliteit: Annuïteiten of ‘‘zo snel mogelijk’’;

- ADSCR (Target): Annual Debt Service Cover Ratio;
- LLCR: Loan Life Cover Ratio;
- Intrestvoeten (evt. aangepast met een sensitiviteitsfactor);
- Fees;
- Opstartkosten.

Bij de terugbetalingmodaliteit "zo snel mogelijk" wordt de terugbetaling per periode dynamisch berekend in functie van de ADSCR Target.

De Covenants (ADSCR en LLCR) worden berekend en getoetst aan de inputparameters.

<u>Definities:</u>

- ADSCR:

Drukt uit in welke mate een project in staat is om zijn leningsverplichtingen (kapitaal en intrestbetalingen) na te komen in een bepaalde periode/jaar (van de looptijd van de lening)

$$\frac{\textit{Beschikbare cashflow voor terugbetalen van schuld (CAFDS)}}{\textit{Aflossingen van de periode (kapitaal en intrest)}}$$

Een ratio lager dan 1 geeft aan dat er onvoldoende cash beschikbaar is in een bepaald jaar om de aflossingen van het jaar te kunnen voldoen.

- LLCR

Drukt uit in welke mate een project over de gehele looptijd van de lening in staat is om alle leningsverplichtingen na te komen

$$\frac{\textit{Netto Contante waarde van beschikbare cash voor terugbetalen van schuld (CAFDS)}}{\textit{Totaal van de openstaande schuld}}$$

Een ratio van 1 geeft aan dat het project precies in staat zal zijn om de lening terug te betalen binnen de gestelde looptijd, waarbij alle beschikbare cash gedurende deze looptijd hiervoor zal gebruikt worden.

4.1.2.2.2. Kapitaal (Equity)

Uit de financieringsbehoefte worden de benodigde kapitaalsinjecties berekend.

Aan het einde van de exploitatieperiode wordt het eigen vermogen uitgekeerd aan de aandeelhouders (via vereffening, liquidatie).

4.1.2.3. SPV Balans

In de vooropgestelde inputparameters worden de werkkapitaalassumpties vastgelegd. Met name wordt het aantal maanden betalingsuitstel ingegeven voor wat betreft:

- Leverancier (voor Capex);
- Leverancier (voor Opex);
- Klant (Availability payments).

Deze worden berekend op de betroffen bedragen en resulteren in eindbalansposities.

4.1.2.3.1. Actief

Op de actiefzijde van de SPV balans staan voornamelijk de ''werken in uitvoering/over te dragen kosten'' tengevolge van de CAPEX van de infrastructuur. Deze groeit aan in de constructieperiode en dan wordt later over de duur van de exploitatieperiode in kosten genomen (conform een lineair afschrijvingspatroon).

Daarnaast staan er nog debiteuren en eventuele kastegoeden/tekorten.

4.1.2.3.2. Passief

Op de passiefzijde staat het kapitaal en overgedragen resultaat.

Daarnaast staat een post ''verkregen opbrengsten'' (Deferred Income). Deze betreft de gefactureerde Construction Payments aan de opdrachtgever/BAM die pas in het resultaat worden genomen in de exploitatieperiode (tegen hetzelfde tempo als de afschrijvingen bij de opdrachtgever/BAM).

Verder het vreemd vermogen (senior debt loan), de leveranciers en de schuld aan BTW en belastingen.

4.1.2.4. SPV Dividenden

De uit te keren dividenden worden berekend vanuit de resultatenrekening. Wanneer er uitkeerbare winst wordt vastgesteld kan dividend uitgekeerd worden voor zover er liquiditeiten beschikbaar zijn. Hierbij wordt in de betrokken periode tevens rekening gehouden met de toekomstige beschikbaarheid van liquiditeiten. De berekende dividenden zijn bruto dividenden. Er wordt geen vermindering voorzien op de 5% van het dividend dat niet in aanmerking voor DBI-vermindering (netto bedraagt de opbrengst na DBI 98,35%).

4.1.3. Opdrachtgever/BAM–Niveau

4.1.3.1. <u>BAM Resultaten rekening/Cashflow</u>

<u>Omzet</u>

De omzet van de BAM bestaat uit de inkomsten vanuit de geheven tolheffingen.

Afhankelijk van het gekozen scenario ontstaan er tolinkomsten door tolheffing op de Oosterweelverbinding en de Kennedytunnel.

In de verkeersmodellen werden de verkeersstromen geprognotiseerd en werden de jaarlijkse aantallen voor auto's, lichte vrachtwagens en zware vrachtwagens afgeleid.

Deze aantallen werden vermenigvuldigd met de vooropgestelde tarieven per rit.

De ingebruikname van de Oosterweelverbinding heeft echter ook een effect op de verkeerstromen en het gebruik van de Liefkenshoektunnel, waardoor er minder tolinkomsten gegenereerd kunnen worden ten opzicht van een ''nul-scenario'' of ''do-minimum''. Deze vermindering van tolinkomsten wordt in mindering gebracht van de tolinkomsten op de Oosterweelverbinding.

Voor de scenario's waar elektronische tolheffing werd vooropgesteld, wordt een correctiefactor voor niet-geïnde tolbedragen ("Leackage") voorzien.

De bedragen werden tevens geïndexeerd op basis van een vooropgestelde inputparameter.

Operationele kosten

De operationele kosten (operating expenses) voor de BAM m.b.t. de Oosterweelverbinding bestaan uit de vanuit de SPV aangerekende Availability Payments. Daarnaast zijn er de exploitatiekosten van de tolheffingsystemen.

Afschrijvingen

De basis van de afschrijvingen betreft door de SPV aangerekende Construction Payments. De afschrijvingen worden lineair berekend op deze investeringen. Hierbij wordt rekening gehouden met de (dynamische) timing van constructie en exploitatieperiode, waarbij de afschrijvingen pas aanvangen op moment van exploitatieperiode. De afschrijvingen lopen lineair over 35 jaar.

Intresten

De intresten in de BAM hebben betrekking op twee posten:

- De intresten komende uit de financiering met vreemd vermogen (senior debt en EIB lening). De intrest wordt berekend:
  - Op het gemiddeld uitstaande bedrag per jaar van het vreemd vermogen;
  - Op basis van vooropgestelde intrestvoet (eventueel aangepast met een sensitiviteitsfactor).
- De intresten op de kasoverschot (cash balance) of kastekorten (cash overdraft). Het basisbedrag van de kaspositie blijkt uit de balans; waarbij het gemiddelde wordt gemaakt van de begin- en eindbalanspositie. Een verschillende intrestvoet wordt toegepast naargelang het een overschot of een tekort betreft.

Belastingen

Op het resultaat voor belastingen wordt een vlakke belasting berekend, op basis van een belastingdrukpercentage in de inputfactoren (Tax rate). Er wordt geen rekening gehouden met eventuele verworpen uitgaven, noch met notionele intrestaftrek of andere fiscale correcties. Recupereerbare verliezen worden naar volgende periodes verschoven. De te betalen belasting wordt in het volgende jaar in cashflow meegenomen.

4.1.3.2. BAM Financiering

Per periode wordt de financieringsbehoefte berekend (funding requirement)

Deze behoefte houdt rekening met:

- Inkomsten vanuit de tolheffing;
- Capex: betalingen aan de SPV voor Construction Payments;
- Opex: betalingen aan de SPV voor de Availability Payments;
- Cashflow effecten van debiteuren, crediteuren en BTW;
- Intresten en fees gedurende de constructieperiode.

De invulling van de financieringsbehoefte wordt volgens de volgende regel verwerkt:

- Kapitaal ten belope van in de inputparameters bepaald percentage van de

financieringsbehoefte;
- Vreemd vermogen ingevuld door de EIB lening, maar tot een maximum van 700 Mio. EUR
- Saldo te financieren door vreemd vermogen (senior debt loan).

Vreemd Vermogen: EIB lening en Senior Debt

In de vooropgestelde inputparameters worden de eigenschappen van deze faciliteiten (mogelijks verschillend per lening) gekozen zijnde:
- Terugbetalingmodaliteit: Annuïteiten of ''zo snel mogelijk'';
- ADSCR (Target): Annual Debt Service Cover Ratio;
- LLCR: Loan Life Cover Ratio;
- Intrestvoeten (evt. aangepast met een sensitiviteitsfactor);
- Fees;
- Opstart kosten;
- Voor de EIB lening wordt een maximum faciliteit opgegeven.

Bij de terugbetalingmodaliteit ''zo snel mogelijk'' wordt de terugbetaling per periode dynamisch berekend in functie van de ADSCR Target.

De Covenants (ADSCR en LLCR) worden berekend en getoetst aan de inputparameters.

4.1.3.3. BAM Balans

In de vooropgestelde inputparameters worden de werkkapitaalassumpties vastgelegd. Met name wordt het aantal maanden betalingsuitstel ingegeven voor wat betreft:
- Klanten: tolheffing;
- Leverancier (SPV);
- BTW.

Deze worden berekend op de betroffen bedragen en resulteren in eindbalansposities.

Actief

Op de actiefzijde van de BAM balans staan voornamelijk de aangerekende Construction payments, die aangroeien in de constructieperiode en dan ten laste van het resultaat worden gebracht in de exploitatieperiode (lineair verdeeld over de exploitatieperiode).

Daarnaast staan er nog debiteuren en eventuele kastegoeden/tekorten.

Passief

Op de passiefzijde staat het kapitaal en overgedragen resultaat.

Verder het vreemd vermogen (EIB lening en senior debt loan), de leveranciers en de schuld aan BTW en belastingen.

4.1.3.4. BAM Dividenden

De uit te keren dividenden worden berekend vanuit de resultatenrekening. Wanneer er uitkeerbare winst wordt vastgesteld kan dividend uitgekeerd worden voor zover er liquiditeiten beschikbaar zijn. Hierbij wordt in de betrokken periode tevens rekening gehouden met de toekomstige beschikbaarheid van liquiditeiten. Het betreft bruto-dividenden.

4.1.4. Project benadering

Naast de inpassing van de financiële stromen van het project in de PPS-structuur, wordt het project geëvalueerd als een investeringsproject, over de verschillende entiteiten (BAM/SPV) heen.

Een Operationele cashflow voor het project wordt berekend, bestaande uit:

- Tolinkomsten;
- Operationele kosten gedurende de exploitatie periode (onderhoud en exploitatie);
- Werkkapitaalmutaties.

Deze wordt vergeleken met de investeringskosten (Capex) om het rendement van het project te berekenen middels:

Project IRR en NPV

- De project IRR is de berekende intrestvoet waarbij de NPV van de operationele kasstromen van het project minus de kasstromen voor de Capex op nul zou vallen.
- De project NPV berekent de huidige waarde van de toekomstige operationele kasstromen van het project, verminderd met de Capex kaststromen, rekening houdend met een in de inputparameters vooropgestelde verdisconteringvoet.

4.1.5. Inputvariabelen en Uitganspunten

De inputvariabelen die aan de basis liggen van de berekeningen in het financieel model werden identiek toegepast op de verschillende scenario's om een zo correct mogelijk onderling vergelijk te kunnen maken.

Enkel voor de looptijd van de constructieperiode en de aftrekbaarheid van de BTW werd er een verschil gemaakt tussen de scenario'

De variabelen betreffen:

- Timings: startdatum en doorlooptijden van de constructie en exploitatie periode. Deze werden door ARUP aangegeven vanuit de technische inschattingen per tracé;
- Index: een jaarlijkse indexfactor van 2 % wordt toegepast op de opbrengsten alsook de kosten (vanaf 2010);
- Availability Payments: er wordt gerekend dat de SPV 100 % kan doorfactureren aan BAM; met andere woorden dat er geen penalties zouden voorkomen door het niet beschikbaar zijn van de infrastructuur op een bepaald moment;
- NPV discounting: de jaarlijkse verdisconteringvoet die gebruikt wordt om de netto contante waarde te berekenen. Er wordt een discontovoet gebruikt van **4 %**, analoog met de maatschappelijke kosten baten analyse uitgevoerd door BAM (november 2004). Dit is conform met de discontovoet zoals voorgesteld in de OOEI en sinds 1995 vastgelegd voor risicovrije projecten in Nederland door het Ministerie van Financiën. Deze discontovoet werd ook gebruikt in uitgevoerde KBA's van infrastructuurprojecten in Vlaanderen (KBA Sigmaplan, KBA Binnenvaartontsluiting Zeebrugge, ...) en voor de KBA voor de renovatie van de Royerssluis.
- Door de toepassing van de index van 2 %, wordt de nominale discontovoet 6,08 %.
- Intrest rates on cash balances: de intrestvoeten die aangerekend worden als er positieve dan wel negatieve kasoverschotten blijken uit de balansen; geschat en afgestemd met de begeleidingscommissie.
- Tax assumptions: een belastingspercentages voor vennootschapsbelasting van 34 % werd toegepast. Het aandeel niet-aftrekbare BTW in scenario ''StRaten Generaal geen tol voor auto's'' werd bepaald op 48 %; voor alle andere scenario's is dit nul %.
- Working Capital assumptions: het aantal maanden betalingsuitstel (klanten en leverancierskrediet) en de BTW belastingspercentages toe te passen op de bedragen

excl. BTW;
- Equity SPV Target IRR: het gewenste doelrendement van de SPV, vastgezet op 15 %;
- Construction funding SPV: Percentage van investeringskosten die de SPV mag aanrekenen als Construction Payment; vastgelegd op 80 % conform DBfM basis;
- Senior Debt – SPV: de condities (fees, intrestvoeten, terugbetalingstermijnen) en voorwaarden (Bank Covenants) van de externe financiering voor de SPV; geschat en afgestemd met de begeleidingscommissie.
- Equity BAM: Percentage van kapitaalsinjecties in functie van de financieringsbehoefte; vastgezet op 20 % (tenzij anders aangegeven)
- EIB Loan BAM: de condities (fees, intrestvoeten, terugbetalingstermijnen) en voorwaarden (Bank Covenants) van een EIB lening; geschat en afgestemd met de begeleidingscommissie.
- Senior Debt BAM: de condities (fees, intrestvoeten, terugbetalingstermijnen) en voorwaarden (Bank Covenants) van een externe financiering op het niveau van BAM; geschat en afgestemd met de begeleidingscommissie.

4.1.6. 6 Kerncijfers en Samenvatting (Summary)

Het summary overzicht van het model bevat de volgende onderdelen:

4.1.6.1. Operationeel
- Controles op de berekeningen in het model (checks);
- Cashpositie op einde van het model (End cash);
- Eindpositie van het overgedragen resultaat (End retained profits);
- De laagste waarde van het kastekort/kastegoed dat uit de balans blijkt (Minimum Cash balance);
- De laagste waarde van het overgedragen resultaat dat uit de balans blijkt (Minimum retained profits).

4.1.6.2. Availability Payment
- Bedrag van de jaarlijkse Availability Payment zoals berekend uit de SPV calculatie.

4.1.6.3. Financiering
- Overzicht van de verschillende type financiering met hun
  - kenmerken/terms
  - looptijd
  - controle of de lening terugbetaald kon worden en laatste terugbetalingperiode
  - berekende laagste waarde van de covenants (ADSCR en LLCR) ten opzichte van hun doelstelling

4.1.6.4. Opbrengst/Returns

Samenvattend worden volgende kerncijfers van het project getoond (niet verdisconteerd):
- Revenues: totale opbrengsten over de exploitatieperiode;
- Operating costs: totale operationele kosten over de exploitatieperiode;
- Operating cashflow: totale operationele cashflow over de exploitatieperiode;
- Operating costs: totale operationele kosten over de exploitatieperiode;
- Capital Expenditure: totale investeringskost.

De financiële evaluatie wordt uitgedrukt in de volgende ratio's:

- IRR: Internal Rate of Return;
- NPV: Net Present Value of Netto Contante Waarde;
- NPV of dividends: Net Present Value van de uitgekeerde dividenden;
- Investment: bedrag aan geïnvesteerd kapitaal;
- Dividends: bedrag van uitgekeerde dividenden (bruto dividenden; niet verdisconteerd).

Deze ratio's worden op niveau van SPV, BAM en op totaal projectniveau berekend. Voor het projectniveau is de IRR en NPV voor en na belastingen weergegeven.

IRR:
- De IRR is de berekende intrestvoet waarbij de NPV van de kasstromen van Kapitaal en uitgekeerde dividenden op nul zou vallen.
- De IRR voor de SPV moet gezien de opzet van het model steeds overeenkomen met het DOELrendement dat in de inputparameters werd vooropgesteld.

NPV (NCW):
- De NPV berekent de huidige waarde van de toekomstige kasstromen van kapitaal en uitgekeerde dividenden, rekening houdend met een in de inputparameters vooropgestelde verdisconteringvoet (4 % reëel).

Project IRR en NPV:
- De project IRR is de berekende intrestvoet waarbij de NPV van de operationele kasstromen van het project minus de kasstromen voor de Capex op nul zou vallen.
- De project NPV berekent de huidige waarde van de toekomstige operationele kasstromen van het project, verminderd met de investeringskasstromen, rekening houdend met een in de inputparameters vooropgestelde verdisconteringvoet (4 % reëel).

4.2 KERNCIJFERS EN RESULTATEN IN HET RAPPORT

Het overzicht van de resultaten en kerncijfers in het rapport bevat de volgende onderdelen:

PROJECT – INFO
- Totaal van de geïndexeerde tolinkomsten over de exploitatieperiode
- Totaal van de Operationele kosten over de exploitatieperiode
- Investeringswaarde: totale geïndexeerde investeringskost
- IRR na belasting van het project
  - De project IRR is de berekende intrestvoet waarbij de NPV van de operationele kasstromen van het project minus de kasstromen voor de Capex op nul zou vallen.
- Netto Contante Waarde na belasting
  - De project Netto Contante Waarde berekent de huidige waarde van de toekomstige operationele kasstromen van het project, verminderd met de investeringskasstromen, rekening houdend met een in de inputparameters vooropgestelde verdisconteringvoet (4 % reëel).

BAM – FINANCIERING
- Senior Debt: Faciliteit: Hoogte van de externe financiering (buiten de EIB lening)
- Senior Debt: jaar van de laatste terugbetaling/waarin de laatste aflossing plaatsvindt
- Senior Debt: Openstaand bedrag: bedrag dat op einde van de looptijd van de lening nog niet terugbetaald kon worden
- Senior Debt: Bank Covenants: beoordeling of aan de vooropgestelde bankvoorwaarden kan voldaan worden: vermelding "OK" of "NIET OK"
- EIB Lening: vermelding van een mogelijks openstaand eindbedrag op het einde van de looptijd van de lening

- Kapitaalsinvestering: Bedrag aan kapitaal dat op basis van het gearing percentage zou ingebracht moeten worden voor het project
- Percentage Kapitaal (Gearing): percentage van Kapitaal dat wordt ingebracht in verhouding tot de totale financieringsbehoefte.
- Minimum kaspositie (kastekort): De laagste waarde van het kastekort/kastegoed dat uit de balans blijkt (Minimum Cash balance); zijnde een tekort waarvoor op dat moment tevens (brug) financiering voor gezocht moet worden.

BAM – RENDEMENT

- Netto Contante Waarde: De NPV berekent de huidige waarde van de toekomstige kasstromen van kapitaal en uitgekeerde dividenden, rekening houdend met een in de inputparameters vooropgestelde verdisconteringvoet (4 % reëel).
- Sunk Costs: Bedrag van de reeds uitgevoerde werken of kosten die reeds gemaakt zijn.
- Netto Contante Waarde na aftrek van de Sunk Costs. Is de netto contante waarde zoals berekend uit het model min de kosten die reeds gemaakt zijn.
- IRR na belasting: De IRR berekent het rendement voor de aandeelhouders op hun geïnvesteerd kapitaal. Het is de berekende intrestvoet waarbij de netto contante waarde van de kasstromen van kapitaal en uitgekeerde dividenden op nul zou vallen.

A16.2. Inputvariabelen van het financieel model

Description	Units	Remark / Source	MODEL behavior	SC 1 : BAM Herzien	ArupSum basis tracé	ArupSum Refined tracé
Scenario Number				1	7	14
Timings						
Model start date	Year		flag fixed	2009	2009	2009
Financial Close / Construction starts	Year	Begin of year	flag fixed	2010	2013	2013
Years of operations	Years	Bijlage 2 : Vlaams kenniscentrum PPS ; Omschrijving PPS Variant	flag fixed	35	35	35
Concession ends	Year	End of year	calculated			
Indexation assumptions						
Indices assumptions constant through concession						
CPI (Revenue)	Logical	Consumer Price Index				
CPI (Costs)	Logical	AP=Cost				
Model indices and escalation factors						
CPI (Revenue)	%		var	2%	2%	2%
CPI (Costs)	%		var	2%	2%	2%
Periodicity of stepping						
Annual			fixed			
Indexation date	Date	Model start + 1	Calculated	2010	2010	2010
Availability payment achieved						
Percentage availability achieved			var	100%	100%	100%
Exploitation Costs						
Percentage on Revenu tolling for transaction/ collecting		ARUP : manual toll labour cost equals electronic toll enforcement costs	var	2%	2%	2%
NPV discounting for revenue						
NPV discounting for revenue						
Discounting % (Real)		Cfr. BAM kosten baten studie	var	4,00%	4,00%	4,00%
Discounting % (Nominal)	%		Calculated			
Base date	Date		var	2009	2009	2009
Intrest rates on cash balances						
Interest rates on cash balances						
EURIBOR		ok begeleidingscomm	var	4,32%	4,32%	4,32%
Positive cash balances						
During operations (EURIBOR minus)	Bps	ok begeleidingscomm	var	50	50	50
Rate	%		Calculated	3,82%	3,82%	3,82%
Overdraft balances						
During operations (EURIBOR plus)	Bps	ok begeleidingscomm	var	100	100	100
Rate	%		Calculated	5,32%	5,32%	5,32%
Tax assumptions						
Tax rate	%	ok begeleidingscomm	var	34%	34%	34%
Non deductable VAT (on AP and CP)	%		var	0%	0%	0%
Working Capital assumptions						
Working Capital						
Capex creditor months	months	ok begeleidingscomm	var	6	6	6
Toll revenue debtor months	months	ok begeleidingscomm	var	-	-	-
Opex costs creditor months	months	ok begeleidingscomm	var	1	1	1
Availability payment creditor months	months	ok begeleidingscomm	var	1	1	1
VAT						
VAT on capex	%		var	21,00%	21,00%	21,00%
VAT on toll revenue	%		var	21,00%	21,00%	21,00%
VAT on opex	%		var	21,00%	21,00%	21,00%
VAT on Availability Payment	%		var	0,00%	0,00%	0,00%
VAT payment terms	months		var	1	1	1
Equity - SPV						
Target IRR			var	15,00%	15,00%	15,00%
Construction funding - SPV						
Construction payments		ok begeleidingscomm	var	80,00%	80,00%	80,00%

A16.2. Inputvariabelen van het financieel model

Description	Units	Remark / Source	MODEL behavior	SC 1 : BAM Herzien	ArupSum basis tracé	ArupSum Refined tracé
Scenario Number				1	7	14
Senior Debt - SPV						
Gearing		ok begeleidingscomm	var	70,00%	70,00%	70,00%
Fees						
Uppfront costs	€000	ok begeleidingscomm	var	100	100	100
Arrangement fee	%	ok begeleidingscomm	var	1,00%	1,00%	1,00%
Commitment fee	%	ok begeleidingscomm	var	0,50%	0,50%	0,50%
Interest Rate Senior Debt						
Base rate / Swap rate	%	3.81% base rate - 30 year Euro swap rate	var	3,81%	3,81%	3,81%
+ [spare]	Bps	2.00% margin - this is our current experience of lending terms.	var	200	200	200
+ [spare]	Bps		var			
+ [spare]	Bps		var			
= Total interest rate	%		Calculated	5,81%	5,81%	5,81%
Repayment method						
As soon as possible (1), annuity (2)	1,2,3		var	2	2	2
Additional drawdown periods after construction	Years		flag var	1	1	1
Number of years for facility	Years		flag var	28	28	28
Number of years annual repayments	Years		calculated			
Bank Covenants		BDO estimate				
Min ADSCR			var	1,150	1,150	1,150
Min LLCR		Minimum ADSCR of 1.15 - this corresponds to a European toll road project we have looked at.	var	1,200	1,200	1,200
Equity - BAM						
Equity injection (as a percentage of funding)			var	20,00%	20,00%	20,00%
Funding - BAM						
Additional drawdown periods after construction	Years		flag var	1	1	1
EIB loan - BAM						
Gearing		Info Ivan Costermans : max	var			
Fees						
Uppfront costs	€000	Estimate : geen info BAM	var	100	100	100
Arrangement fee	%	Estimate : geen info BAM	var	1,00%	1,00%	1,00%
Commitment fee	%	Estimate : geen info BAM	var	0,50%	0,50%	0,50%
Interest Rate Senior Debt						
Base rate / Swap rate	%	3.81% base rate - 30 year Euro swap rate	var	3,81%	3,81%	3,81%
+ [spare]	Bps	Opm. begeleidingscomm	var	25	25	25
+ [spare]	Bps		var			
+ [spare]	Bps		var			
= Total interest rate	%		calculated	4,06%	4,06%	4,06%
Facility term	Years		flag var	28	28	28
Bank Covenants						
Min ADSCR		Opm. begeleidingscomm	var	1,100	1,100	1,100
Senior Debt - BAM						
Fees						
Uppfront costs	€000	ok begeleidingscomm	var	100	100	100
Arrangement fee	%	ok begeleidingscomm	var	1,00%	1,00%	1,00%
Commitment fee	%	ok begeleidingscomm	var	0,50%	0,50%	0,50%
Interest Rate Senior Debt		Estimate BDO				
Base rate / Swap rate	%	3.81% base rate - 30 year Euro swap rate	var	3,81%	3,81%	3,81%
+ [spare]	Bps	2.00% margin - this is our current experience of lending terms.	var	200	200	200
+ [spare]	Bps		var			
+ [spare]	Bps		var			
= Total interest rate	%			5,81%	5,81%	5,81%
Repayment method						
As soon as possible (1), annuity (2)	1,2,3		var	1	1	1
Facility term	Years		flag var	28	28	28
Bank Covenants						
Min ADSCR		Minimum ADSCR of 1.15 - this corresponds to a European toll road project we have looked at.	var	1,150	1,150	1,150
Min LLCR		ok begeleidingscomm	var	1,200	1,200	1,200
Inputs USED						

A.16.3 Detail van de investeringskosten en onderhoudskosten

		in Miljoen €			in Miljoen €			in Miljoen €		
NR	BESCHRIJVING	TOTAL COSTS			SUNK COSTS			NETTO CAPEX COSTS		
		BAM	ARUP	ARUP	BAM	ARUP	ARUP	BAM	ARUP	ARUP
			ArupSum Basis	ArupSum Refined		ArupSum Basis	ArupSum Refined		ArupSum Basis	ArupSum Refined
DEEL I LINKEROEVER: OWV										
1	Infrastructuur wegenis E17 tot aan Kennedytunnel + tolinfrastructuur	459,73	474,32	474,32	0,00	0,00	0,00	459,73	474,32	474,32
2	Groenproject en landschappelijke aanpassingen Burchtste Weel	8,96	8,96	8,96	0,39	0,39	0,39	8,56	8,56	8,56
3	Groenproject en landschappelijke aanpassingen Middenvijver	1,95	1,95	1,95	1,28	1,28	1,28	0,67	0,67	0,67
4	Groenproject en landschappelijke aanpassingen Sint-Annabos	1,95	0,98	0,98				1,95	0,98	0,98
5	Aanpassingen Kennedytunnel : enkel signalisatie vrachtverkeer	5,21	5,21					5,21	5,21	0,00
6	Aanpassingen Kennedytunnel	5,00	5,00	25,00				5,00	5,00	25,00
7	Nieuwe tolinfrastructuur Kennedytunnel	0,00	0,00	Included				0,00	0,00	0,00
TOTAAL DEEL I : LINKEROEVER OWV		**482,80**	**496,41**	**511,20**	**1,68**	**1,68**	**1,68**	**481,12**	**494,73**	**509,52**
DEEL II SCHELDE-ONDERTUNNELING: OWV										
8	Afgezonken tunnel + Infrastructuur tunnelmond linkeroever	576,94	Replaced	Replaced				576,94		
9	Maatregelen scheepvaart - fazering	5,00	0,00	0,00				5,00	0,00	0,00
10	Maatregelen Atofina - pijpleidingen	5,00	1,00	1,00				5,00	1,00	1,00
TOTAAL DEEL II SCHELDE-ONDERTUNNELING OWV		**586,94**	**1,00**	**1,00**	**0,00**	**0,00**	**0,00**	**586,94**	**1,00**	**1,00**
DEEL III RECHTEROEVER: OWV										
11	Infrastructuur Oosterweelknooppunt	34,71	0,00	0,00				34,71	0,00	0,00
12	Infrastructuur verbinding haven	2,00						2,00	0,00	0,00
14	Aanpassingen Scheldelaan	5,00	5,00	5,00				5,00	5,00	5,00
17	Amerikadok - ondergronds talud en aanvaarbeveiliging	7,50	0,00	0,00				7,50	0,00	0,00
18	Dubbeldek-brug met tuikabels : 1,705 km	650,00						650,00	0,00	0,00
19	Aanpassingen Lobroekdok	15,00	5,00	5,00				15,00	5,00	5,00
20	Aanpassingen complex Merksem richting E19 Breda	37,05						37,05	0,00	0,00
21	Aanpassingen Singel noord deel II	32,33	5,00	5,00				32,33	5,00	5,00
22	Aanpassingen stedelijke Ringweg en Singel met E313/E34 : upgrade R1	361,73	181,61	181,61				361,73	181,61	181,61
31	Inname busstation De Lijn - infrastructuurkost Belgasite	3,25	0,00	0,00	3,25			0,00	0,00	0,00
32	Aanpassingen het Schijn	5,21	5,21	5,21	5,21	5,21	5,21	0,00	0,00	0,00
33	Geboorde tunnels diameter 12,6 m : vier ; 4 x 2 rijvakken ; 4 km							0,00	0,00	0,00
34	Divergerende structuur							0,00	0,00	0,00
35	Geboorde tunnels diameter 15,2 m ; dubbel : 3 + 3 rijvakken ; 7,6 km							0,00	0,00	0,00
36	Geboorde tunnels diameter 15,2 m ; enkel : 3 rijvakken ; 1,5 km							0,00	0,00	0,00
36 bis	Geboorde tunnels diameter 15,1 m ; 2 x 3 rijvakken ; 9,0 km (2 x 4,5) incl. interventie schacht		1.257,23	1.257,23					1.257,23	1.257,23
37	Verbindingsgalerijen		included	included				0,00	0,00	0,00
38	Open bouwputgedeeltes							0,00	0,00	0,00
39	Infrastructuur Ekerenknooppunt : A12		148,46	148,46				0,00	148,46	148,46
40	Maatregelen HST							0,00	0,00	0,00
41	Ventilatieschachten en nooduitgangen		included	included				0,00	0,00	0,00
42	Compenserende maatregelen bovengrondse infrastructuur (compensatie-grouting,....)		included	included				0,00	0,00	0,00
43	Bovengrondse maatregelen tunnelling Amerikadok, 1/2/3e Havendok		included	included				0,00	0,00	0,00
44	Maatregelen concessies Amerikadok, 1/2/3e Havendok		included	included				0,00	0,00	0,00
TOTAAL DEEL III RECHTEROEVER OWV		**1.153,77**	**1.607,51**	**1.607,51**	**8,46**	**5,21**	**5,21**	**1.145,31**	**1.602,30**	**1.602,30**
DEEL IV DIVERSE KOSTEN OWV										
45	Verplaatsen nutsleidingen (Eandis, Waterbedrijf, Belgacom,...)	7,30	7,30	7,30				7,30	7,30	7,30
56	ATM (upgrade) / ITS		0,00	13,40					0,00	13,40
46	Verplaatsen ondergrondse pijpleidingen	2,00	2,00	2,00				2,00	2,00	2,00
47	Aanpassingen diverse rioleringen	2,00	2,00	2,00				2,00	2,00	2,00
48	Afbraakkosten gebouwen	4,00	10,00	10,00				4,00	10,00	10,00
49	Kost geluidsschermen	10,00	15,00	15,00				10,00	15,00	15,00
50	Sanering van vervuilde sites	40,00	40,00	40,00				40,00	40,00	40,00
51	Flankerende en natuur & milieugebonden maatregelen	30,00	20,00	20,00				30,00	20,00	20,00
52	Verzekeringskosten (decenale, ABR,...)	37,10	37,10	37,10				37,10	37,10	37,10
53	Onteigeningskosten	41,66	18,51	18,51	12,40	12,40	12,40	29,26	6,11	6,11
53 bis	Onteigeningskosten land concessies		24,46	24,46					24,46	24,46
54	Grondverwervingen	180,00	120,00	120,00	180,00	120,00	120,00	0,00	0,00	0,00
55	Studie- en managementskosten	124,90	182,50	182,50	75,85	22,76	22,76	49,05	159,75	159,75
TOTAAL DEEL IV DIVERSE KOSTEN OWV		**478,95**	**478,86**	**492,26**	**268,25**	**155,16**	**155,16**	**210,70**	**323,71**	**337,11**
GLOBAAL TOTAAL (I tem IV) OWV		**2.702,46**	**2.583,78**	**2.611,97**	**278,39**	**162,04**	**162,04**	**2.424,08**	**2.421,74**	**2.449,93**
CONCESSION compensation			**80,00**	**80,00**						

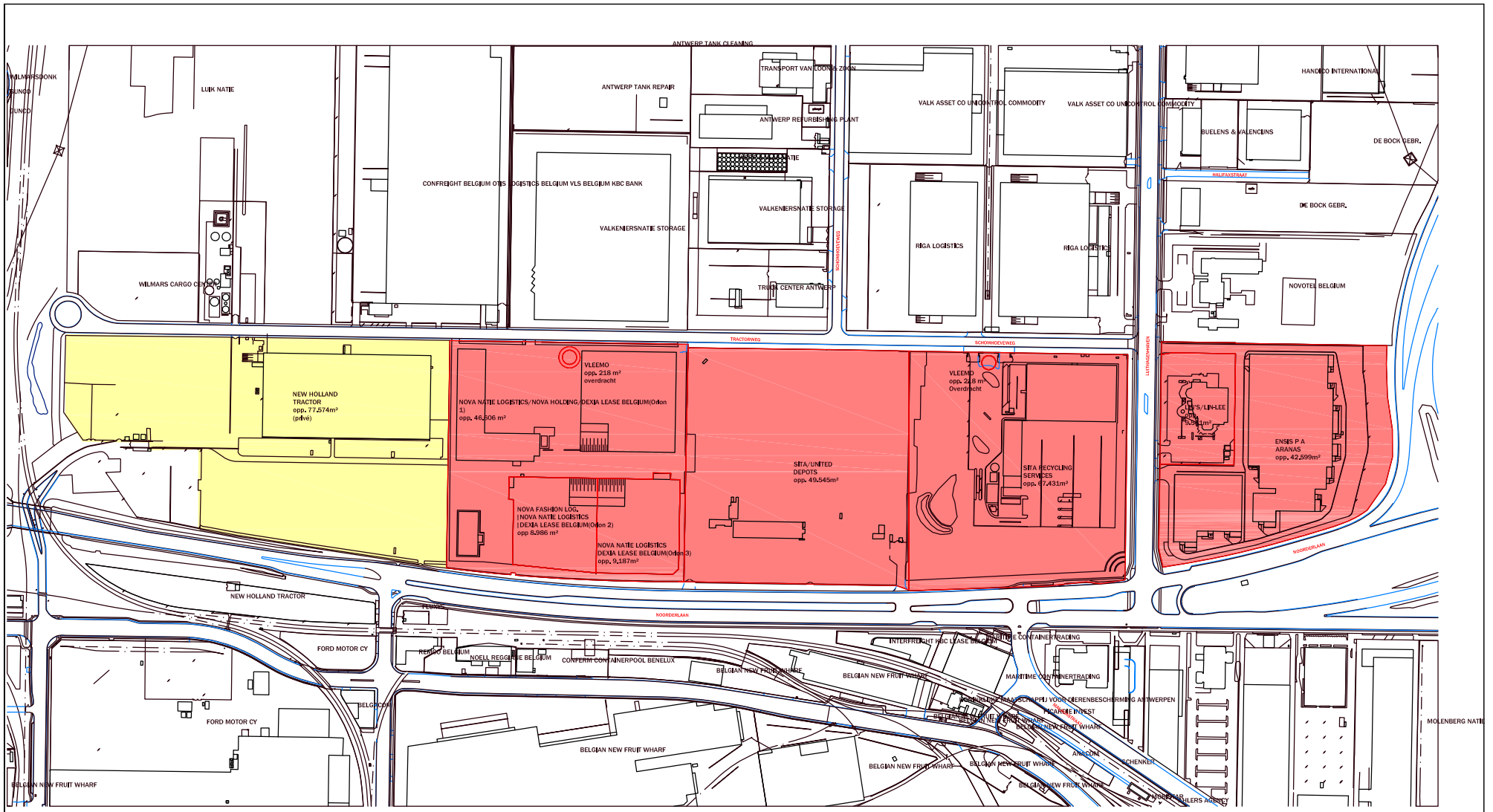
A.16.3 Detail van de investeringskosten en onderhoudskosten

							in Miljoen €								in Miljoen €			
NR	BESCHRIJVING		Maintenance %				MAINTENANCE COST				Risk estimate %				Risk Amount			
			BAM	BAM	ARUP	ARUP	BAM	BAM	ARUP	ARUP	BAM	BAM	ARUP	ARUP	BAM	BAM	ARUP	ARUP
				Revised	ArupSum Basis	ArupSum Refined		Revised	ArupSum Basis	ArupSum Refined		Revised	ArupSum Basis	ArupSum Refined		Revised	ArupSum Basis	ArupSum Refined
DEEL I LINKEROEVER: OWV																		
1	Infrastructuur wegenis E17 tot aan Kennedytunnel + tolinfrastructuur		1,5%	1,5%	1,5%	1,5%	6,90	6,90	7,11	7,11	10,0%	10,0%	10,0%	10,0%	45,97	45,97	47,43	47,43
2	Groenproject en landschappelijke aanpassingen Burchtste Weel		0,0%	0,0%	0,0%	0,0%	0,00	0,00	0,00	0,00	5,0%	5,0%	5,0%	5,0%	0,43	0,43	0,43	0,43
3	Groenproject en landschappelijke aanpassingen Middenvijver		0,0%	0,0%	0,0%	0,0%	0,00	0,00	0,00	0,00	5,0%	5,0%	5,0%	5,0%	0,03	0,03	0,03	0,03
4	Groenproject en landschappelijke aanpassingen Sint-Annabos		0,0%	0,0%	0,0%	0,0%	0,00	0,00	0,00	0,00	5,0%	5,0%	5,0%	5,0%	0,10	0,10	0,05	0,05
5	Aanpassingen Kennedytunnel : enkel signalisatie vrachtverkeer		1,0%	1,0%	1,0%	1,0%	0,05	0,05	0,05	0,00	30,0%	20,0%	20,0%	20,0%	1,56	1,04	1,04	0,00
6	Aanpassingen Kennedytunnel		1,0%	1,0%	1,0%	1,0%	0,05	0,05	0,05	0,25	30,0%	20,0%	20,0%	20,0%	1,50	1,00	1,00	5,00
7	Nieuwe tolinfrastructuur Kennedytunnel		1,5%	1,5%	1,5%	1,5%	0,00		0,00		10,0%	10,0%	10,0%	10,0%	0,00	0,00	0,00	0,00
TOTAAL DEEL I : LINKEROEVER OWV							7,00	7,00	7,22	7,36					49,60	48,57	49,98	52,94
DEEL II SCHELDE-ONDERTUNNELING: OWV																		
8	Afgezonken tunnel + Infrastructuur tunnelmond linkeroever		1,0%	1,0%	0,0%	0,0%	5,77	5,77			20,0%	10,0%	20,0%	20,0%	115,39	57,69	0,00	0,00
9	Maatregelen scheepvaart - fazering		0,0%	0,0%	0,0%	0,0%	0,00	0,00	0,00	0,00	10,0%	10,0%	10,0%	10,0%	0,50	0,50	0,00	0,00
10	Maatregelen Atofina - pijpleidingen		0,0%	0,0%	0,0%	0,0%	0,00	0,00	0,00	0,00	30,0%	30,0%	30,0%	30,0%	1,50	1,50	0,30	0,30
TOTAAL DEEL II SCHELDE-ONDERTUNNELING OWV							5,77	5,77	0,00	0,00					117,39	59,69	0,30	0,30
DEEL III RECHTEROEVER: OWV																		
11	Infrastructuur Oosterweelknooppunt		1,5%	1,5%	1,5%	1,5%	0,52	0,52	0,00	0,00	10,0%	10,0%	10,0%	10,0%	3,47	3,47	0,00	0,00
12	Infrastructuur verbinding haven		1,5%	1,5%	1,5%	1,5%	0,03		0,00	0,00	10,0%	10,0%	10,0%	10,0%	0,20	0,20	0,00	0,00
14	Aanpassingen Scheldelaan		1,5%	1,5%	1,5%	1,5%	0,08	0,08	0,08	0,08	10,0%	10,0%	10,0%	10,0%	0,50	0,50	0,50	0,50
17	Amerikadok - ondergronds talud en aanvaarbeveiliging		0,0%	0,0%	0,0%	0,0%	0,00	0,00	0,00	0,00				0,0%	0,00	0,00	0,00	0,00
18	Dubbeldek-brug met tuikabels : 1,705 km		3,0%	2,0%		0,0%	19,50	13,00	0,00	0,00	15,0%	15,0%			97,50	97,50	0,00	0,00
19	Aanpassingen Lobroekdok		1,5%	1,5%	1,5%	1,5%	0,23	0,23	0,08	0,08	10,0%	10,0%	10,0%	10,0%	1,50	1,50	0,50	0,50
20	Aanpassingen complex Merksem richting E19 Breda		1,5%	1,5%	1,5%	1,5%	0,56	0,56	0,00	0,00	10,0%	10,0%	10,0%	10,0%	3,71	3,71	0,00	0,00
21	Aanpassingen Singel noord deel II		1,5%	1,5%	1,5%	1,5%	0,48	0,48	0,08	0,08	10,0%	10,0%	10,0%	10,0%	3,23	3,23	0,50	0,50
22	Aanpassingen stedelijke Ringweg en Singel met E313/E34 : upgrade R1		1,5%	1,5%	1,5%	1,5%	5,43	5,43	2,72	2,72	10,0%	10,0%	20,0%	20,0%	36,17	36,17	36,32	36,32
31	Inname busstation De Lijn - infrastructuurkost Belgasite		0,0%	0,0%	0,0%	0,0%	0,00	0,00	0,00	0,00				0,0%	0,00	0,00	0,00	0,00
32	Aanpassingen het Schijn		0,0%	0,0%	0,0%	0,0%	0,00	0,00	0,00	0,00				0,0%	0,00	0,00	0,00	0,00
33	Geboorde tunnels diameter 12,6 m : vier ; 4 x 2 rijvakken ; 4 km		1,2%	1,2%	1,2%	1,2%	0,00	0,00	0,00	0,00	25,0%	25,0%	25,0%	25,0%	0,00	0,00	0,00	0,00
34	Divergerende structuur		1,2%	1,2%	1,2%	1,2%	0,00	0,00	0,00	0,00	25,0%	25,0%	25,0%	25,0%	0,00	0,00	0,00	0,00
35	Geboorde tunnels diameter 15,2 m ; dubbel : 3 + 3 rijvakken ; 7,6 km		1,2%	1,2%	1,2%	1,2%	0,00	0,00	0,00	0,00	25,0%	25,0%	25,0%	25,0%	0,00	0,00	0,00	0,00
36	Geboorde tunnels diameter 15,2 m ; enkel : 3 rijvakken ; 1,5 km		1,2%	1,2%	1,2%	1,2%	0,00	0,00	0,00	0,00	25,0%	25,0%	25,0%	25,0%	0,00	0,00	0,00	0,00
36 bis	Geboorde tunnels diameter 15,1 m ; 2 x 3 rijvakken ; 9,0 km (2 x 4,5) incl. interventie schacht				1,2%	1,2%		0,00	15,09	15,09			20,0%	20,0%		0,00	251,45	251,45
37	Verbindingsgalerijen		1,2%	1,2%	1,2%	1,2%	0,00	0,00			25,0%	25,0%	25,0%	25,0%	0,00	0,00	0,00	0,00
38	Open bouwputgedeeltes		1,2%	1,2%	1,2%	1,2%	0,00		0,00	0,00	15,0%	15,0%	15,0%	15,0%	0,00	0,00	0,00	0,00
39	Infrastructuur Ekerenknooppunt : A12		1,5%	1,5%	1,5%	1,5%	0,00	0,00	2,23	2,23	10,0%	10,0%	10,0%	10,0%	0,00	0,00	14,85	14,85
40	Maatregelen HST		0,0%	0,0%	0,0%	0,0%	0,00	0,00	0,00	0,00				0,0%	0,00	0,00	0,00	0,00
41	Ventilatieschachten en nooduitgangen		1,5%	1,5%	1,5%	1,5%	0,00				15,0%	15,0%	15,0%	15,0%	0,00	0,00	0,00	0,00
42	Compenserende maatregelen bovengrondse infrastructuur (compensatie-grouting,....)		0,0%	0,0%	0,0%	0,0%	0,00							0,0%	0,00	0,00	0,00	0,00
43	Bovengrondse maatregelen tunnelling Amerikadok, 1/2/3e Havendok		0,0%	0,0%	0,0%	0,0%	0,00							0,0%	0,00	0,00	0,00	0,00
44	Maatregelen concessies Amerikadok, 1/2/3e Havendok		0,0%	0,0%	0,0%	0,0%	0,00							0,0%	0,00	0,00	0,00	0,00
TOTAAL DEEL III RECHTEROEVER OWV							26,82	20,29	20,26	20,26					146,28	146,28	304,11	304,11
DEEL IV DIVERSE KOSTEN OWV																		
45	Verplaatsen nutsleidingen (Eandis, Waterbedrijf, Belgacom,...)		1,5%	0,0%	0,0%	0,0%	0,11	0,00	0,00	0,00					0,00	0,00	0,00	0,00
56	ATM (upgrade) / ITS				2,0%	2,0%	0,00	0,00	0,00	0,27					0,00	0,00	0,00	0,00
46	Verplaatsen ondergrondse pijpleidingen		1,5%	0,0%	0,0%	0,0%	0,03	0,00	0,00	0,00					0,00	0,00	0,00	0,00
47	Aanpassingen diverse rioleringen		1,5%	0,0%	0,0%	0,0%	0,03	0,00	0,00	0,00					0,00	0,00	0,00	0,00
48	Afbraakkosten gebouwen					0,0%	0,00	0,00	0,00	0,00					0,00	0,00	0,00	0,00
49	Kost geluidsschermen		1,5%	1,5%	1,5%	1,5%	0,15	0,15	0,23	0,23					0,00	0,00	0,00	0,00
50	Sanering van vervuilde sites					0,0%	0,00	0,00	0,00	0,00					0,00	0,00	0,00	0,00
51	Flankerende en natuur & milieugebonden maatregelen					0,0%	0,00	0,00	0,00	0,00					0,00	0,00	0,00	0,00
52	Verzekeringskosten (decenale, ABR,...)					0,0%	0,00	0,00	0,00	0,00					0,00	0,00	0,00	0,00
53	Onteigeningskosten					0,0%	0,00	0,00	0,00	0,00					0,00	0,00	0,00	0,00
53 bis	Onteigeningskosten land concessies					0,0%	0,00	0,00	0,00	0,00					0,00	0,00	0,00	0,00
54	Grondverwervingen					0,0%	0,00	0,00	0,00	0,00					0,00	0,00	0,00	0,00
55	Studie- en managementskosten					0,0%	0,00	0,00	0,00	0,00					0,00	0,00	0,00	0,00
TOTAAL DEEL IV DIVERSE KOSTEN OWV							0,32	0,15	0,23	0,49					0,00	0,00	0,00	0,00
GLOBAAL TOTAAL (I tem IV) OWV							39,90	33,20	27,70	28,12					313,26	254,55	354,40	357,36
CONCESSION compensation																		

Bijlage A16.4 :Studie waarde concessies Luithaegen

BRON : Haven Antwerpen

1	**NOVA NATIE LOGISTICS NV - Romeynsweel 3, 2030 A'pen**		
	(hoofdelijk en solidair)		
	C1316-C1342-C1423		
	ca. Oppervlakte:	65.200,00	m²
	Einddatum:	31/12/2046	
	Doel:	opslag van goederen	
	Gemiddelde concessievergoeding/jaar:	206.684,00	EUR
	Eigen investering door concessionaris:	19.069.000,00	EUR
2	**VLEEMO NV - Romeynsweel 3, 2030 A'pen**		
	C1444		
	ca. Oppervlakte:	186,00	m²
	Einddatum:	20 jaar na bekomen vergunningen	
	Doel:	oprichten en uitbaten van een windmolen	
	Eigen investering door concessionaris:	voor de 4 windmolens zone Luithagen samen: 11.000.000	EUR
3	**SITA RECYCLING SERVICES NV**		
	CONTAINER CENTER ANTWERPEN NV		
	Noorderlaan 600, 2030 Antwerpen		
	C1431 (hoofdelijk en solidair)		
	ca. Oppervlakte:	49.545,00	m²
	Einddatum:	31/12/2045	
	Doel:	container repair / recyclage van goederen	
	Gemiddelde concessievergoeding/jaar:	227.907,00	EUR
	Eigen investering door concessionaris:	ZIE INVESTERINGEN NR.4	
4	**SITA RECYCLING SERVICES NV**		
	Noorderlaan 600, 2030 Antwerpen		
	C.784		
	ca. Oppervlakte:	67.886,00	m²
	Einddatum:	31/12/2045	
	Doel:	recyclage van goederen	
	Gemiddelde concessievergoeding/jaar:	312.275,60	EUR
	Eigen investering door concessionaris:	24.789.352,48	EUR
5	**VLEEMO NV - Noorderlaan 600, 2030 Antwerpen**		
	C1445		
	ca. Oppervlakte:	186,00	m²
	Einddatum:	20 jaar na bekomen vergunningen	
	Doel:	oprichten en uitbaten van een windmolen	
	Eigen investering door concessionaris:	voor de 4 windmolens zone Luithagen samen: 11.000.000,00	EUR
6	**WILMARS CARGO CENTER NV**		
	langsheen Romeynsweel		
	C1404		
	ca. Oppervlakte:	9.390,00	m²
	Einddatum:	31/12/2043	
	Doel:	exploitatie van opslag-en distributiecentrum	
	Gemiddelde concessievergoeding/jaar:	29.766,30	EUR
	Eigen investering door concessionaris:	2.000.000,00	EUR
38	**LIN'S BVBA**		
	Luithagen 4, 2030 Antwerpen		
	C1467		
	ca. Oppervlakte:	9.561,00	m²
	Einddatum:	31/12/2021	
	Doel:	exploiteren van een restaurantbedrijf met bijhorende inrichtingen	
	Gemiddelde concessievergoeding/jaar:	40.235,56	EUR
	Eigen investering door concessionaris:	aankoop gebouwen vorige concessionaris voor een bedrag van: 700.000,00	EUR
39	**ENSIS NV**		
	Luithagen Haven 2b, 2030 Antwerpen		
	C200		
	ca. Oppervlakte:	42.599,00	m²
	Einddatum:	31/12/2026	
	Doel:	goederenopslag	
	Gemiddelde concessievergoeding/jaar:	187.467,70	EUR
	Eigen investering door concessionaris:	aankoop gebouw van vorige concessionaris ten bedrage van: 14.023.336,70	EUR



ultv.	datum	get.	wijzigingen

getekend: GB	datum: 29/05/2009	bestek:	prijs: €

Opgemaakt door
Antwerpen

Ir.
Ingenieur

Gezien en voorgesteld
Antwerpen

Ir. G. Bernaers
Bestuurder-directeur

Port of Antwerp

INFRASTRUCTUUR

Concessieterreinen Luithagen

schalen:	nagezien:	plannr.:
1/4000	G. Brosens CAD-Ontwerper	PRE-141

A16.5. Uitkomsten Financieel model: ArupSum tracé: Basis

A 16.5.1 Project

Calcs / Scenario Calculations														
ArupSum basis tracé Sensitivity: Case 1: Base														
	INPUT		Check	TOTAL	2.009	2.010	2.011	2.012	2.013	2.014	2.015	2.016	2.017
			FALSE		1	2	3	4	5	6	7	8	9
CASH FLOW STATEMENT														
Operating Cash Flow														
Revenues				9.561.880	-	-	-	-	-	-	-	-	142.214
Operating costs during contruction				-	-	-	-	-	-	-	-	-	-
Operating costs during operations				(1.819.635)	-	-	-	-	-	-	-	-	(35.381)
Non deductable VAT on Availability Payments				-	-	-	-	-	-	-	-	-	-
Debtor cashflow				-	-	-	-	-	-	-	-	-	-
Creditor cashflow				-	-	-	-	-	396.482	7.930	8.088	8.250	(420.750)
VAT cashflow				-	-	-	-	-	(11.468)	(229)	(234)	(239)	14.091
Total Operating Cash Flow				7.742.245	-	-	-	-	385.014	7.700	7.854	8.011	(299.825)
Capital Expenditure														
Development costs				-	-	-	-	-	-	-	-	-	-
Construction costs				(2.701.064)	-	-	-	-	(655.342)	(668.449)	(681.818)	(695.455)	-
Non deductable VAT on Construction Payments				-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure				(2.701.064)	-	-	-	-	(655.342)	(668.449)	(681.818)	(695.455)	-
Tax				(938.736)	-	-	-	-	-	-	-	-	-
Net cash flow before financing				**4.102.445**	**-**	**-**	**-**	**-**	**(270.329)**	**(660.749)**	**(673.964)**	**(687.443)**	**(299.825)**
PROJECT RETURNS														
Operating cash flow				7.742.245	-	-	-	-	385.014	7.700	7.854	8.011	(299.825)
Capital expenditure				(2.701.064)	-	-	-	-	(655.342)	(668.449)	(681.818)	(695.455)	-
Tax				(938.736)	-	-	-	-	-	-	-	-	-
Total project cashflows before tax				5.041.181	-	-	-	-	(270.329)	(660.749)	(673.964)	(687.443)	(299.825)
Total project cashflows after tax				4.102.445	-	-	-	-	(270.329)	(660.749)	(673.964)	(687.443)	(299.825)
IRR before tax				5,48%									
IRR after tax				4,76%									
NPV before tax	6,08%			(162.480)									
NPV after tax				(340.067)									

Calcs / Scenario Calculations												
ArupSum basis tracé Sensitivity: Case 1: Base												
	INPUT	2.018	2.019	2.020	2.021	2.022	2.023	2.024	2.025	2.026	2.027	2.028
		10	11	12	13	14	15	16	17	18	19	20
CASH FLOW STATEMENT												
Operating Cash Flow												
Revenues		150.222	158.493	167.035	172.405	177.948	183.670	189.576	195.673	201.966	208.463	215.169
Operating costs during contruction		-	-	-	-	-	-	-	-	-	-	-
Operating costs during operations		(36.205)	(37.048)	(37.910)	(38.709)	(39.525)	(40.358)	(41.210)	(42.080)	(42.969)	(43.878)	(44.806)
Non deductable VAT on Availability Payments		-	-	-	-	-	-	-	-	-	-	-
Debtor cashflow		-	-	-	-	-	-	-	-	-	-	-
Creditor cashflow		-	-	-	-	-	-	-	-	-	-	-
VAT cashflow		129	133	138	82	85	88	91	94	97	100	104
Total Operating Cash Flow		114.146	121.578	129.263	133.778	138.508	143.399	148.457	153.686	159.094	164.685	170.466
Capital Expenditure												
Development costs		-	-	-	-	-	-	-	-	-	-	-
Construction costs		-	-	-	-	-	-	-	-	-	-	-
Non deductable VAT on Construction Payments		-	-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure		-	-	-	-	-	-	-	-	-	-	-
Tax		(11.301)	(11.259)	(11.956)	(12.670)	(13.465)	(14.326)	(15.203)	(16.095)	(17.004)	(17.930)	(18.873)
Net cash flow before financing		**102.845**	**110.320**	**117.306**	**121.108**	**125.043**	**129.073**	**133.254**	**137.591**	**142.089**	**146.755**	**151.593**
PROJECT RETURNS												
Operating cash flow		114.146	121.578	129.263	133.778	138.508	143.399	148.457	153.686	159.094	164.685	170.466
Capital expenditure		-	-	-	-	-	-	-	-	-	-	-
Tax		(11.301)	(11.259)	(11.956)	(12.670)	(13.465)	(14.326)	(15.203)	(16.095)	(17.004)	(17.930)	(18.873)
Total project cashflows before tax		114.146	121.578	129.263	133.778	138.508	143.399	148.457	153.686	159.094	164.685	170.466
Total project cashflows after tax		102.845	110.320	117.306	121.108	125.043	129.073	133.254	137.591	142.089	146.755	151.593
IRR before tax												
IRR after tax												
NPV before tax	6,08%											
NPV after tax												

A16.5. Uitkomsten Financieel model: ArupSum tracé: Basis

A 16.5.1 Project

Calcs / Scenario Calculations														
ArupSum basis tracé Sensitivity: Case 1: Base														
	INPUT	2.029	2.030	2.031	2.032	2.033	2.034	2.035	2.036	2.037	2.038	2.039	2.040	2.041
		21	22	23	24	25	26	27	28	29	30	31	32	33
CASH FLOW STATEMENT														
Operating Cash Flow														
Revenues		222.091	229.236	236.612	244.226	252.086	260.199	268.574	277.219	286.143	295.355	304.865	314.681	324.814
Operating costs during contruction		-	-	-	-	-	-	-	-	-	-	-	-	-
Operating costs during operations		(45.754)	(46.723)	(47.713)	(48.725)	(49.759)	(50.815)	(51.895)	(52.998)	(54.125)	(55.277)	(56.454)	(57.657)	(58.887)
Non deductable VAT on Availability Payments		-	-	-	-	-	-	-	-	-	-	-	-	-
Debtor cashflow		-	-	-	-	-	-	-	-	-	-	-	-	-
Creditor cashflow		-	-	-	-	-	-	-	-	-	-	-	-	-
VAT cashflow		107	111	114	118	122	126	131	135	140	144	149	154	159
Total Operating Cash Flow		176.444	182.624	189.013	195.619	202.449	209.510	216.810	224.356	232.158	240.222	248.559	257.178	266.086
Capital Expenditure														
Development costs		-	-	-	-	-	-	-	-	-	-	-	-	-
Construction costs		-	-	-	-	-	-	-	-	-	-	-	-	-
Non deductable VAT on Construction Payments		-	-	-	-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure		-	-	-	-	-	-	-	-	-	-	-	-	-
Tax		(19.834)	(20.813)	(21.811)	(22.828)	(23.866)	(24.925)	(26.005)	(27.108)	(28.234)	(29.384)	(30.558)	(31.758)	(32.985)
Net cash flow before financing		**156.610**	**161.811**	**167.203**	**172.791**	**178.583**	**184.585**	**190.804**	**197.248**	**203.924**	**210.839**	**218.001**	**225.419**	**233.102**
PROJECT RETURNS														
Operating cash flow		176.444	182.624	189.013	195.619	202.449	209.510	216.810	224.356	232.158	240.222	248.559	257.178	266.086
Capital expenditure		-	-	-	-	-	-	-	-	-	-	-	-	-
Tax		(19.834)	(20.813)	(21.811)	(22.828)	(23.866)	(24.925)	(26.005)	(27.108)	(28.234)	(29.384)	(30.558)	(31.758)	(32.985)
Total project cashflows before tax		176.444	182.624	189.013	195.619	202.449	209.510	216.810	224.356	232.158	240.222	248.559	257.178	266.086
Total project cashflows after tax		156.610	161.811	167.203	172.791	178.583	184.585	190.804	197.248	203.924	210.839	218.001	225.419	233.102
IRR before tax														
IRR after tax														
NPV before tax	6,08%													
NPV after tax														

Calcs / Scenario Calculations											
ArupSum basis tracé Sensitivity: Case 1: Base											
	INPUT	2.042	2.043	2.044	2.045	2.046	2.047	2.048	2.049	2.050	2.051
		34	35	36	37	38	39	40	41	42	43
CASH FLOW STATEMENT											
Operating Cash Flow											
Revenues		335.274	346.072	357.219	368.725	380.603	392.865	405.522	418.588	432.077	446.000
Operating costs during contruction		-	-	-	-	-	-	-	-	-	-
Operating costs during operations		(60.144)	(61.428)	(62.741)	(64.083)	(65.454)	(66.856)	(68.288)	(69.753)	(71.250)	(72.780)
Non deductable VAT on Availability Payments		-	-	-	-	-	-	-	-	-	-
Debtor cashflow		-	-	-	-	-	-	-	-	-	-
Creditor cashflow		-	-	-	-	-	-	-	-	-	-
VAT cashflow		165	170	176	182	188	194	201	208	215	222
Total Operating Cash Flow		275.295	284.815	294.654	304.825	315.338	326.204	337.435	349.043	361.042	373.442
Capital Expenditure											
Development costs		-	-	-	-	-	-	-	-	-	-
Construction costs		-	-	-	-	-	-	-	-	-	-
Non deductable VAT on Construction Payments		-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure		-	-	-	-	-	-	-	-	-	-
Tax		(34.499)	(35.514)	(36.586)	(37.676)	(38.782)	(39.906)	(41.048)	(42.208)	(43.386)	(88.939)
Net cash flow before financing		**240.796**	**249.301**	**258.068**	**267.149**	**276.555**	**286.297**	**296.387**	**306.835**	**317.655**	**284.503**
PROJECT RETURNS											
Operating cash flow		275.295	284.815	294.654	304.825	315.338	326.204	337.435	349.043	361.042	373.442
Capital expenditure		-	-	-	-	-	-	-	-	-	-
Tax		(34.499)	(35.514)	(36.586)	(37.676)	(38.782)	(39.906)	(41.048)	(42.208)	(43.386)	(88.939)
Total project cashflows before tax		275.295	284.815	294.654	304.825	315.338	326.204	337.435	349.043	361.042	373.442
Total project cashflows after tax		240.796	249.301	258.068	267.149	276.555	286.297	296.387	306.835	317.655	284.503
IRR before tax											
IRR after tax											
NPV before tax	6,08%										
NPV after tax											

A 16.5 Uitkomsten Financieel model: ArupSum Tracé: Basis

A 16.5.2 Niveau SPV entiteit

Calcs / Scenario Calculations																
ArupSum basis tracé Sensitivity: Case 1: Base																
Calculate / Optimise Payment	INPUT		Check	TOTAL	2.009	2.010	2.011	2.012	2.013	2.014	2.015	2.016	2.017	2.018	2.019
			TRUE		1	2	3	4	5	6	7	8	9	10	11
CASH FLOW STATEMENT																
Operating Cash Flow																
Revenues : Construction payments				2.109.665	-	-	-	-	216.263	528.599	539.171	549.955	275.678	-	-
Revenues : Availability payments				5.290.609	-	-	-	-	-	-	-	-	105.824	107.940	110.099
Operating costs during contruction				-	-	-	-	-	-	-	-	-	-	-	-
Operating costs during operations				(1.622.569)	-	-	-	-	-	-	-	-	(32.455)	(33.104)	(33.766)
Debtor cashflow				-	-	-	-	-	-	-	-	-	(8.819)	(176)	(180)
Creditor cashflow				-	-	-	-	-	396.482	7.930	8.088	8.250	(420.750)	-	-
VAT cashflow				(0)	-	-	-	-	(11.468)	(229)	(234)	(239)	11.602	(11)	(12)
Total Operating Cash Flow				5.777.705	-	-	-	-	601.277	536.299	547.025	557.966	(68.919)	74.649	76.142
Capital Expenditure																
Development costs				-	-	-	-	-	-	-	-	-	-	-	-
Construction costs				(2.701.064)	-	-	-	-	(655.342)	(668.449)	(681.818)	(695.455)	-	-	-
				-											
Total Capital Expenditure				(2.701.064)	-	-	-	-	(655.342)	(668.449)	(681.818)	(695.455)	-	-	-
Tax				(938.736)	-	-	-	-	-	-	-	-	-	(11.301)	(11.259)
Net cash flow before financing				**2.137.905**	**-**	**-**	**-**	**-**	**(54.066)**	**(132.150)**	**(134.793)**	**(137.489)**	**(68.919)**	**63.347**	**64.883**
Financing																
Equity injection					-	-	-	-	18.430	41.741	44.088	46.538	27.267	-	-
Equity repayment					-	-	-	-	-	-	-	-	-	-	-
Debt drawdown				349.352	-	-	-	-	35.636	90.409	90.705	90.951	41.652	-	-
Loan interest and fees (excl. rolled up)				(348.025)	-	-	-	-	-	-	-	-	-	(24.140)	(23.613)
Repayments				(415.483)	-	-	-	-	-	-	-	-	-	(9.057)	(9.583)
Total Financing				(414.155)	-	-	-	-	54.066	132.150	134.793	137.489	68.919	(33.196)	(33.196)
Net cash flow after financing				**1.723.750**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**30.151**	**31.686**
Interest on Cash Balance				98.502	-	-	-	-	-	-	-	-	-	576	605
Interest on Overdraft				-	-	-	-	-	-	-	-	-	-	-	-
Dividends				(1.822.252)	-	-	-	-	-	-	-	-	-	(30.727)	(32.292)
NET CASH FLOW			**TRUE**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Cash position begin period					-	-	-	-	-	-	-	-	-	-	-
Net cash flow in period					-	-	-	-	-	-	-	-	-	-	-
Cash position end period			**TRUE**	-	-	-	-	-	-	-	-	-	-	-	-

Calcs / Scenario Calculations															
ArupSum basis tracé Sensitivity: Case 1: Base															
Calculate Optimise Payment	INPUT	2.020	2.021	2.022	2.023	2.024	2.025	2.026	2.027	2.028	2.029	2.030	2.031	2.032	2.033
		12	13	14	15	16	17	18	19	20	21	22	23	24	25
CASH FLOW STATEMENT															
Operating Cash Flow															
Revenues : Construction payments		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Revenues : Availability payments		112.301	114.547	116.838	119.175	121.558	123.990	126.469	128.999	131.579	134.210	136.894	139.632	142.425	145.273
Operating costs during contruction		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operating costs during operations		(34.441)	(35.130)	(35.833)	(36.550)	(37.281)	(38.026)	(38.787)	(39.562)	(40.354)	(41.161)	(41.984)	(42.824)	(43.680)	(44.554)
Debtor cashflow		(183)	(187)	(191)	(195)	(199)	(203)	(207)	(211)	(215)	(219)	(224)	(228)	(233)	(237)
Creditor cashflow		-	-	-	-	-	-	-	-	-	-	-	-	-	-
VAT cashflow		(12)	(12)	(12)	(13)	(13)	(13)	(13)	(14)	(14)	(14)	(14)	(15)	(15)	(15)
Total Operating Cash Flow		77.664	79.218	80.802	82.418	84.066	85.748	87.463	89.212	90.996	92.816	94.672	96.566	98.497	100.467
Capital Expenditure															
Development costs		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Construction costs		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tax		(11.956)	(12.670)	(13.465)	(14.326)	(15.203)	(16.095)	(17.004)	(17.930)	(18.873)	(19.834)	(20.813)	(21.811)	(22.828)	(23.866)
Net cash flow before financing		**65.708**	**66.547**	**67.337**	**68.092**	**68.864**	**69.652**	**70.458**	**71.282**	**72.123**	**72.982**	**73.860**	**74.755**	**75.669**	**76.601**
Financing															
Equity injection		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equity repayment		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Debt drawdown		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loan interest and fees (excl. rolled up)		(23.057)	(22.467)	(21.844)	(21.185)	(20.487)	(19.748)	(18.967)	(18.140)	(17.265)	(16.340)	(15.360)	(14.324)	(13.227)	(12.067)
Repayments		(10.140)	(10.729)	(11.352)	(12.012)	(12.710)	(13.448)	(14.230)	(15.056)	(15.931)	(16.857)	(17.836)	(18.872)	(19.969)	(21.129)
Total Financing		(33.196)	(33.196)	(33.196)	(33.196)	(33.196)	(33.196)	(33.196)	(33.196)	(33.196)	(33.196)	(33.196)	(33.196)	(33.196)	(33.196)
Net cash flow after financing		**32.511**	**33.351**	**34.141**	**34.896**	**35.667**	**36.456**	**37.262**	**38.086**	**38.927**	**39.786**	**40.663**	**41.559**	**42.472**	**43.405**
Interest on Cash Balance		621	811	1.133	1.432	1.707	1.957	2.178	2.371	2.533	2.663	2.758	2.816	2.836	2.815
Interest on Overdraft		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dividends		(28.579)	(26.137)	(27.809)	(29.511)	(31.244)	(33.009)	(34.805)	(36.636)	(38.500)	(40.401)	(42.338)	(44.314)	(46.328)	(48.384)
NET CASH FLOW		**4.553**	**8.025**	**7.465**	**6.817**	**6.130**	**5.404**	**4.635**	**3.821**	**2.960**	**2.048**	**1.083**	**61**	**(1.020)**	**(2.164)**
Cash position begin period		-	4.553	12.578	20.043	26.860	32.990	38.394	43.029	46.850	49.809	51.857	52.940	53.001	51.981
Net cash flow in period		4.553	8.025	7.465	6.817	6.130	5.404	4.635	3.821	2.960	2.048	1.083	61	(1.020)	(2.164)
Cash position end period		4.553	12.578	20.043	26.860	32.990	38.394	43.029	46.850	49.809	51.857	52.940	53.001	51.981	49.816

A 16.5 Uitkomsten Financieel model: ArupSum Tracé: Basis

A 16.5.2 Niveau SPV entiteit

Calcs / Scenario Calculations													
ArupSum basis tracé Sensitivity: Case 1: Base													
Calculate / Optimise Payment	INPUT	2.034	2.035	2.036	2.037	2.038	2.039	2.040	2.041	2.042	2.043	2.044	2.045
		26	27	28	29	30	31	32	33	34	35	36	37
CASH FLOW STATEMENT													
Operating Cash Flow													
Revenues : Construction payments		-	-	-	-	-	-	-	-	-	-	-	-
Revenues : Availability payments		148.179	151.143	154.165	157.249	160.394	163.602	166.874	170.211	173.615	177.088	180.629	184.242
Operating costs during contruction		-	-	-	-	-	-	-	-	-	-	-	-
Operating costs during operations		(45.445)	(46.354)	(47.281)	(48.226)	(49.191)	(50.175)	(51.178)	(52.202)	(53.246)	(54.311)	(55.397)	(56.505)
Debtor cashflow		(242)	(247)	(252)	(257)	(262)	(267)	(273)	(278)	(284)	(289)	(295)	(301)
Creditor cashflow		-	-	-	-	-	-	-	-	-	-	-	-
VAT cashflow		(16)	(16)	(16)	(17)	(17)	(17)	(18)	(18)	(18)	(19)	(19)	(19)
Total Operating Cash Flow		102.476	104.526	106.617	108.749	110.924	113.142	115.405	117.713	120.067	122.469	124.918	127.417
Capital Expenditure													
Development costs		-	-	-	-	-	-	-	-	-	-	-	-
Construction costs		-	-	-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure		-	-	-	-	-	-	-	-	-	-	-	-
Tax		(24.925)	(26.005)	(27.108)	(28.234)	(29.384)	(30.558)	(31.758)	(32.985)	(34.499)	(35.514)	(36.586)	(37.676)
Net cash flow before financing		**77.552**	**78.521**	**79.508**	**80.515**	**81.540**	**82.584**	**83.647**	**84.728**	**85.568**	**86.955**	**88.332**	**89.741**
Financing													
Equity injection		-	-	-	-	-	-	-	-	-	-	-	-
Equity repayment		-	-	-	-	-	-	-	-	-	-	-	-
Debt drawdown		-	-	-	-	-	-	-	-	-	-	-	-
Loan interest and fees (excl. rolled up)		(10.839)	(9.540)	(8.166)	(6.711)	(5.172)	(3.544)	(1.821)	-	-	-	-	-
Repayments		(22.357)	(23.656)	(25.031)	(26.485)	(28.024)	(29.652)	(31.366)	-	-	-	-	-
Total Financing		(33.196)	(33.196)	(33.196)	(33.196)	(33.196)	(33.196)	(33.187)	-	-	-	-	-
Net cash flow after financing		**44.355**	**45.324**	**46.312**	**47.319**	**48.344**	**49.388**	**50.460**	**84.728**	**85.568**	**86.955**	**88.332**	**89.741**
Interest on Cash Balance		2.750	2.640	2.481	2.270	2.005	1.682	1.299	1.618	2.241	2.988	3.737	4.488
Interest on Overdraft		-	-	-	-	-	-	-	-	-	-	-	-
Dividends		(50.481)	(52.621)	(54.807)	(57.039)	(59.319)	(61.648)	(60.530)	(70.469)	(68.938)	(71.020)	(73.135)	(75.283)
NET CASH FLOW		**(3.376)**	**(4.657)**	**(6.014)**	**(7.450)**	**(8.970)**	**(10.578)**	**(8.771)**	**15.878**	**18.871**	**18.923**	**18.934**	**18.945**
Cash position begin period		49.816	46.441	41.783	35.769	28.319	19.349	8.771	-	15.878	34.749	53.672	72.606
Net cash flow in period		(3.376)	(4.657)	(6.014)	(7.450)	(8.970)	(10.578)	(8.771)	15.878	18.871	18.923	18.934	18.945
Cash position end period		46.441	41.783	35.769	28.319	19.349	8.771	-	15.878	34.749	53.672	72.606	91.551

Calcs / Scenario Calculations														
ArupSum basis tracé Sensitivity: Case 1: Base														
Calculate / Optimise Payment	INPUT	2.046	2.047	2.048	2.049	2.050	2.051	2.052	2.053	2.054	2.055	2.056	2.057	2.058
		38	39	40	41	42	43	44	45	46	47	48	49	50
CASH FLOW STATEMENT														
Operating Cash Flow														
Revenues : Construction payments		-	-	-	-	-	-	-	-	-	-	-	-	-
Revenues : Availability payments		187.927	191.685	195.519	199.429	203.418	207.486	-	-	-	-	-	-	-
Operating costs during contruction		-	-	-	-	-	-	-	-	-	-	-	-	-
Operating costs during operations		(57.635)	(58.788)	(59.963)	(61.163)	(62.386)	(63.634)	-	-	-	-	-	-	-
Debtor cashflow		(307)	(313)	(319)	(326)	(332)	(339)	17.291	-	-	-	-	-	-
Creditor cashflow		-	-	-	-	-	-	-	-	-	-	-	-	-
VAT cashflow		(20)	(20)	(21)	(21)	(21)	(22)	1.114	-	-	-	-	-	-
Total Operating Cash Flow		129.965	132.564	135.216	137.920	140.678	143.492	18.404	-	-	-	-	-	-
Capital Expenditure														
Development costs		-	-	-	-	-	-	-	-	-	-	-	-	-
Construction costs		-	-	-	-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure		-	-	-	-	-	-	-	-	-	-	-	-	-
Tax		(38.782)	(39.906)	(41.048)	(42.208)	(43.386)	(88.939)	-	-	-	-	-	-	-
Net cash flow before financing		**91.183**	**92.658**	**94.167**	**95.712**	**97.292**	**54.553**	**18.404**	**-**	**-**	**-**	**-**	**-**	**-**
Financing														
Equity injection		-	-	-	-	-	-	-	-	-	-	-	-	-
Equity repayment		-	-	-	-	-	(178.064)	-	-	-	-	-	-	-
Debt drawdown		-	-	-	-	-	-	-	-	-	-	-	-	-
Loan interest and fees (excl. rolled up)		-	-	-	-	-	-	-	-	-	-	-	-	-
Repayments		-	-	-	-	-	-	-	-	-	-	-	-	-
Total Financing		-	-	-	-	-	(178.064)	-	-	-	-	-	-	-
Net cash flow after financing		**91.183**	**92.658**	**94.167**	**95.712**	**97.292**	**(123.511)**	**18.404**	**-**	**-**	**-**	**-**	**-**	**-**
Interest on Cash Balance		5.239	5.991	6.745	7.499	8.255	4.763	-	-	-	-	-	-	-
Interest on Overdraft		-	-	-	-	-	-	-	-	-	-	-	-	-
Dividends		(77.465)	(79.682)	(81.933)	(84.221)	(86.544)	(67.697)	(18.404)	-	-	-	-	-	-
NET CASH FLOW		**18.956**	**18.967**	**18.979**	**18.990**	**19.002**	**(186.446)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Cash position begin period		91.551	110.507	129.475	148.453	167.443	186.446	-	-	-	-	-	-	-
Net cash flow in period		18.956	18.967	18.979	18.990	19.002	(186.446)	-	-	-	-	-	-	-
Cash position end period		110.507	129.475	148.453	167.443	186.446	-	-	-	-	-	-	-	-

A 16.5 Uitkomsten Financieel model: ArupSum Tracé: Basis

A 16.5.2 Niveau SPV entiteit

PROFIT AND LOSS STATEMENT															
			TOTAL	2.009	2.010	2.011	2.012	2.013	2.014	2.015	2.016	2.017	2.018	2.019
Revenues															
a) Construction payments (deferred)			2.109.665	-	-	-	-	-	-	-	-	60.276	60.276	60.276
b) Availability payments			5.290.609	-	-	-	-	-	-	-	-	105.824	107.940	110.099
Operating costs during operations			(1.622.569)	-	-	-	-	-	-	-	-	(32.455)	(33.104)	(33.766)
Deffered costs (Depreciation Capex)			(2.745.224)	-	-	-	-	-	-	-	-	(78.435)	(78.435)	(78.435)
EBIT			3.032.481	-	-	-	-	-	-	-	-	**55.210**	**56.677**	**58.174**
Interest and fees on financing			(369.996)	-	-	-	-	-	-	-	-	(21.971)	(24.140)	(23.613)
Interest on Cash Balance / Overdraft			98.502	-	-	-	-	-	-	-	-	-	576	605
Result before taxes			2.760.988	-	-	-	-	-	-	-	-	**33.239**	**33.114**	**35.166**
Tax			(938.736)	-	-	-	-	-	-	-	-	(11.301)	(11.259)	(11.956)
Profit after tax				-	-	-	-	-	-	-	-	21.938	21.855	23.210
Dividends			(1.822.252)	-	-	-	-	-	-	-	-	-	(30.727)	(32.292)
NET Result			**0**	-	-	-	-	-	-	-	-	**21.938**	**(8.872)**	**(9.082)**
Non depreciated LAND			-												
Net cash flow			0												
		TRUE	0												

BALANCE SHEET Extract															
			TOTAL	2.009	2.010	2.011	2.012	2.013	2.014	2.015	2.016	2.017	2.018	2.019
Work in progress / Deferred costs															
Land				0	0	0	0	0	0	0	0	0	0	0	0
Capex				0	0	0	0	662.710	1.338.146	2.032.132	2.745.224	2.666.789	2.588.354	2.509.919
				0	0	0	0	662.710	1.338.146	2.032.132	2.745.224	2.666.789	2.588.354	2.509.919
Debtors				-	-	-	-	-	-	-	-	8.819	8.995	9.175
Cash Balance				0	0	0	0	0	0	0	0	0	0	0
TOTAL ASSETS				**0**	**0**	**0**	**0**	**662.710**	**1.338.146**	**2.032.132**	**2.745.224**	**2.675.607**	**2.597.349**	**2.519.094**
Equity				-	-	-	-	18.430	60.171	104.259	150.797	178.064	178.064	178.064
P&L Reserves				0	0	0	0	0	0	0	0	21.938	13.066	3.984
Deferred income				-	-	-	-	216.263	744.862	1.284.033	1.833.988	2.049.389	1.989.113	1.928.837
Loan				0	0	0	0	43.003	140.399	243.271	351.860	415.483	406.426	396.843
Creditor				-	-	-	-	396.482	404.412	412.500	420.750	-	-	-
VAT Creditor				-	-	-	-	(11.468)	(11.698)	(11.932)	(12.170)	(568)	(579)	(591)
Tax creditor				0	0	0	0	0	0	0	0	11.301	11.259	11.956
TOTAL LIABILITIES				**0**	**0**	**0**	**0**	**662.710**	**1.338.146**	**2.032.132**	**2.745.224**	**2.675.607**	**2.597.349**	**2.519.094**
		TRUE		0	0	0	0	0	0	0	0	0	0	0

PROFIT AND LOSS STATEMENT															
		2.020	2.021	2.022	2.023	2.024	2.025	2.026	2.027	2.028	2.029	2.030	2.031	2.032	2.033
Revenues															
a) Construction payments (deferred)		60.276	60.276	60.276	60.276	60.276	60.276	60.276	60.276	60.276	60.276	60.276	60.276	60.276	60.276
b) Availability payments		112.301	114.547	116.838	119.175	121.558	123.990	126.469	128.999	131.579	134.210	136.894	139.632	142.425	145.273
Operating costs during operations		(34.441)	(35.130)	(35.833)	(36.550)	(37.281)	(38.026)	(38.787)	(39.562)	(40.354)	(41.161)	(41.984)	(42.824)	(43.680)	(44.554)
Deffered costs (Depreciation Capex)		(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)
EBIT		**59.701**	**61.258**	**62.846**	**64.466**	**66.119**	**67.805**	**69.524**	**71.277**	**73.066**	**74.891**	**76.752**	**78.650**	**80.586**	**82.561**
Interest and fees on financing		(23.057)	(22.467)	(21.844)	(21.185)	(20.487)	(19.748)	(18.967)	(18.140)	(17.265)	(16.340)	(15.360)	(14.324)	(13.227)	(12.067)
Interest on Cash Balance / Overdraft		621	811	1.133	1.432	1.707	1.957	2.178	2.371	2.533	2.663	2.758	2.816	2.836	2.815
Result before taxes		**37.265**	**39.602**	**42.135**	**44.714**	**47.340**	**50.013**	**52.735**	**55.509**	**58.334**	**61.214**	**64149**	**67.142**	**70.195**	**73.309**
Tax		(12.670)	(13.465)	(14.326)	(15.203)	(16.095)	(17.004)	(17.930)	(18.873)	(19.834)	(20.813)	(21.811)	(22.828)	(23.866)	(24.925)
Profit after tax		24.595	26.137	27.809	29.511	31.244	33.009	34.805	36.636	38.500	40.401	42.338	44.314	46.328	48.384
Dividends		(28.579)	(26.137)	(27.809)	(29.511)	(31.244)	(33.009)	(34.805)	(36.636)	(38.500)	(40.401)	(42.338)	(44.314)	(46.328)	(48.384)
NET Result		**(3.984)**	-	-	-	-	-	-	-	-	-	-	-	-	-
Non depreciated LAND															
Net cash flow															

BALANCE SHEET Extract															
		2.020	2.021	2.022	2.023	2.024	2.025	2.026	2.027	2.028	2.029	2.030	2.031	2.032	2.033
Work in progress / Deferred costs															
Land		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capex		2.431.484	2.353.049	2.274.614	2.196.179	2.117.744	2.039.309	1.960.874	1.882.439	1.804.004	1.725.569	1.647.134	1.568.699	1.490.264	1.411.829
		2.431.484	2.353.049	2.274.614	2.196.179	2.117.744	2.039.309	1.960.874	1.882.439	1.804.004	1.725.569	1.647.134	1.568.699	1.490.264	1.411.829
Debtors		9.358	9.546	9.737	9.931	10.130	10.332	10.539	10.750	10.965	11.184	11.408	11.636	11.869	12.106
Cash Balance		4.553	12.578	20.043	26.860	32.990	38.394	43.029	46.850	49.809	51.857	52.940	53.001	51.981	49.816
TOTAL ASSETS		**2.445.396**	**2.375.173**	**2.304.393**	**2.232.970**	**2.160.864**	**2.088.035**	**2.014.442**	**1.940.039**	**1.864.778**	**1.788.610**	**1.711.482**	**1.633.336**	**1.554.114**	**1.473.752**
Equity		178.064	178.064	178.064	178.064	178.064	178.064	178.064	178.064	178.064	178.064	178.064	178.064	178.064	178.064
P&L Reserves		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deferred income		1.868.561	1.808.285	1.748.009	1.687.732	1.627.456	1.567.180	1.506.904	1.446.628	1.386.352	1.326.075	1.265.799	1.205.523	1.145.247	1.084.971
Loan		386.703	375.974	364.622	352.610	339.900	326.452	312.223	297.166	281.235	264.378	246.542	227.670	207.701	186.571
Creditor		-	-	-	-	-	-	-	-	-	-	-	-	-	-
VAT Creditor		(603)	(615)	(627)	(640)	(652)	(665)	(679)	(692)	(706)	(720)	(735)	(749)	(764)	(780)
Tax creditor		12.670	13.465	14.326	15.203	16.095	17.004	17.930	18.873	19.834	20.813	21.811	22.828	23.866	24.925
TOTAL LIABILITIES		**2.445.396**	**2.375.173**	**2.304.393**	**2.232.970**	**2.160.864**	**2.088.035**	**2.014.442**	**1.940.039**	**1.864.778**	**1.788.610**	**1.711.482**	**1.633.336**	**1.554.114**	**1.473.752**
		0	0	0	0	0	0	0	0	0	0	0	0	0	0

A 16.5 Uitkomsten Financieel model: ArupSum Tracé: Basis

A 16.5.2 Niveau SPV entiteit

PROFIT AND LOSS STATEMENT													
		2.034	2.035	2.036	2.037	2.038	2.039	2.040	2.041	2.042	2.043	2.044	2.045
Revenues													
a) Construction payments (deferred)		60.276	60.276	60.276	60.276	60.276	60.276	60.276	60.276	60.276	60.276	60.276	60.276
b) Availability payments		148.179	151.143	154.165	157.249	160.394	163.602	166.874	170.211	173.615	177.088	180.629	184.242
Operating costs during operations		(45.445)	(46.354)	(47.281)	(48.226)	(49.191)	(50.175)	(51.178)	(52.202)	(53.246)	(54.311)	(55.397)	(56.505)
Deffered costs (Depreciation Capex)		(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)
EBIT		**84.575**	**86.630**	**88.726**	**90.864**	**93.044**	**95.268**	**97.537**	**99.850**	**102.211**	**104.618**	**107.074**	**109.578**
Interest and fees on financing		(10.839)	(9.540)	(8.166)	(6.711)	(5.172)	(3.544)	(1.821)	-	-	-	-	-
Interest on Cash Balance / Overdraft		2.750	2.640	2.481	2.270	2.005	1.682	1.299	1.618	2.241	2.988	3.737	4.488
Result before taxes		**76.486**	**79.729**	**83.041**	**86.422**	**89.877**	**93.407**	**97.015**	**101.469**	**104.452**	**107.606**	**110.811**	**114.066**
Tax		(26.005)	(27.108)	(28.234)	(29.384)	(30.558)	(31.758)	(32.985)	(34.499)	(35.514)	(36.586)	(37.676)	(38.782)
Profit after tax		50.481	52.621	54.807	57.039	59.319	61.648	64.030	66.969	68.938	71.020	73.135	75.283
Dividends		(50.481)	(52.621)	(54.807)	(57.039)	(59.319)	(61.648)	(60.530)	(70.469)	(68.938)	(71.020)	(73.135)	(75.283)
NET Result		-	-	-	-	-	-	**3.500**	**(3.500)**	-	-	-	-
Non depreciated LAND													
Net cash flow													
BALANCE SHEET Extract													
		2.034	**2.035**	**2.036**	**2.037**	**2.038**	**2.039**	**2.040**	**2.041**	**2.042**	**2.043**	**2.044**	**2.045**
Work in progress / Deferred costs													
Land		0	0	0	0	0	0	0	0	0	0	0	0
Capex		1.333.394	1.254.959	1.176.524	1.098.089	1.019.655	941.220	862.785	784.350	705.915	627.480	549.045	470.610
		1.333.394	1.254.959	1.176.524	1.098.089	1.019.655	941.220	862.785	784.350	705.915	627.480	549.045	470.610
Debtors		12.348	12.595	12.847	13.104	13.366	13.633	13.906	14.184	14.468	14.757	15.052	15.353
Cash Balance		46.441	41.783	35.769	28.319	19.349	8.771	0	15.878	34.749	53.672	72.606	91.551
TOTAL ASSETS		**1.392.183**	**1.309.338**	**1.225.141**	**1.139.513**	**1.052.370**	**963.624**	**876.691**	**814.412**	**755.131**	**695.909**	**636.704**	**577.515**
Equity		178.064	178.064	178.064	178.064	178.064	178.064	178.064	178.064	178.064	178.064	178.064	178.064
P&L Reserves		0	0	0	0	0	0	3.500	0	0	0	0	0
Deferred income		1.024.695	964.419	904.142	843.866	783.590	723.314	663.038	602.762	542.485	482.209	421.933	361.657
Loan		164.214	140.558	115.528	89.043	61.019	31.366	0	0	0	0	0	0
Creditor		-	-	-	-	-	-	-	-	-	-	-	-
VAT Creditor		(795)	(811)	(827)	(844)	(861)	(878)	(896)	(914)	(932)	(950)	(969)	(989)
Tax creditor		26.005	27.108	28.234	29.384	30.558	31.758	32.985	34.499	35.514	36.586	37.676	38.782
TOTAL LIABILITIES		**1.392.183**	**1.309.338**	**1.225.141**	**1.139.513**	**1.052.370**	**963.624**	**876.691**	**814.412**	**755.131**	**695.909**	**636.704**	**577.515**
		0	0	0	0	0	0	0	0	0	0	0	0

PROFIT AND LOSS STATEMENT														
		2.046	2.047	2.048	2.049	2.050	2.051	2.052	2.053	2.054	2.055	2.056	2.057	2.058
Revenues														
a) Construction payments (deferred)		60.276	60.276	60.276	60.276	60.276	60.276	-	-	-	-	-	-	-
b) Availability payments		187.927	191.685	195.519	199.429	203.418	207.486	-	-	-	-	-	-	-
Operating costs during operations		(57.635)	(58.788)	(59.963)	(61.163)	(62.386)	(63.634)	-	-	-	-	-	-	-
Deffered costs (Depreciation Capex)		(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	(78.435)	-	-	-	-	-	-	-
EBIT		**112.133**	**114.739**	**117.397**	**120.108**	**122.873**	**125.694**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Interest and fees on financing		-	-	-	-	-	-	-	-	-	-	-	-	-
Interest on Cash Balance / Overdraft		5.239	5.991	6.745	7.499	8.255	4.763	-	-	-	-	-	-	-
Result before taxes		**117.372**	**120.730**	**124.141**	**127.607**	**131.128**	**130.457**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Tax		(39.906)	(41.048)	(42.208)	(43.386)	(44.583)	(44.355)	-	-	-	-	-	-	-
Profit after tax		77.465	79.682	81.933	84.221	86.544	86.102	-	-	-	-	-	-	-
Dividends		(77.465)	(79.682)	(81.933)	(84.221)	(86.544)	(67.697)	(18.404)	-	-	-	-	-	-
NET Result		**-**	**-**	**-**	**-**	**-**	**18.404**	**(18.404)**	**-**	**-**	**-**	**-**	**-**	**-**
Non depreciated LAND														
Net cash flow														
BALANCE SHEET Extract														
		2.046	2.047	2.048	2.049	2.050	2.051	2.052	2.053	2.054	2.055	2.056	2.057	2.058
Work in progress / Deferred costs														
Land		0	0	0	0	0	0	0	0	0	0	0	0	0
Capex		392.175	313.740	235.305	156.870	78.435	0	0	0	0	0	0	0	0
		392.175	313.740	235.305	156.870	78.435	0	0	0	0	0	0	0	0
Debtors		15.661	15.974	16.293	16.619	16.951	17.291	-	-	-	-	-	-	-
Cash Balance		110.507	129.475	148.453	167.443	186.446	0	0	0	0	0	0	0	0
TOTAL ASSETS		**518.343**	**459.188**	**400.051**	**340.932**	**281.832**	**17.291**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Equity		178.064	178.064	178.064	178.064	178.064	-	-	-	-	-	-	-	-
P&L Reserves		0	0	0	0	0	18.404	0	0	0	0	0	0	0
Deferred income		301.381	241.105	180.828	120.552	60.276	0	0	0	0	0	0	0	0
Loan		0	0	0	0	0	0	0	0	0	0	0	0	0
Creditor		-	-	-	-	-	-	-	-	-	-	-	-	-
VAT Creditor		(1.009)	(1.029)	(1.049)	(1.070)	(1.092)	(1.114)	-	-	-	-	-	-	-
Tax creditor		39.906	41.048	42.208	43.386	44.583	0	0	0	0	0	0	0	0
TOTAL LIABILITIES		**518.343**	**459.188**	**400.051**	**340.932**	**281.832**	**17.291**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	0	0	0	0	0	0	0	0	0	0	0	0

A 16.5 Uitkomsten Financieel model: ArupSum tracé: Basis

A 16.5.3 Niveau BAM entiteit

Calcs / Scenario Calculations																			
ArupSum basis tracé Sensitivity: Case 1: Base																			
Calculate	INPUT		Check	TOTAL	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
			FALSE		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CASH FLOW STATEMENT																			
Operating Cash Flow																			
Revenues				9.561.880	-	-	-	-	-	-	-	-	142.214	150.222	158.493	167.035	172.405	177.948	183.670
Availability Payment				(5.290.609)	-	-	-	-	-	-	-	-	(105.824)	(107.940)	(110.099)	(112.301)	(114.547)	(116.838)	(119.175)
Non deductable VAT on Availability Payments	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operational Expenses				(197.066)	-	-	-	-	-	-	-	-	(2.926)	(3.101)	(3.282)	(3.469)	(3.578)	(3.692)	(3.809)
Debtor cashflow				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Creditor cashflow				-	-	-	-	-	-	-	-	-	8.819	176	180	183	187	191	195
VAT cashflow				-	-	-	-	-	-	-	-	-	2.489	140	145	149	94	97	100
Total Operating Cash Flow				4.074.205	-	-	-	-	-	-	-	-	44.772	39.497	45.437	51.598	54.560	57.706	60.981
Capital Expenditure																			
Construction payments				(2.109.665)	-	-	-	-	(216.263)	(528.599)	(539.171)	(549.955)	(275.678)	-	-	-	-	-	-
Non deductable VAT on Construction Payments	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure				(2.109.665)	-	-	-	-	(216.263)	(528.599)	(539.171)	(549.955)	(275.678)	-	-	-	-	-	-
Tax				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net cash flow before financing				**1.964.540**	**-**	**-**	**-**	**-**	**(216.263)**	**(528.599)**	**(539.171)**	**(549.955)**	**(230.906)**	**39.497**	**45.437**	**51.598**	**54.560**	**57.706**	**60.981**
Financing																			
Equity injection				464.383	-	-	-	-	49.512	110.674	116.652	123.800	63.744	-	-	-	-	-	-
Equity repayment				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EIB drawdown				639.556	-	-	-	-	183.720	423.549	32.286	-	-	-	-	-	-	-	-
Senior debt drawdown				1.017.795	-	-	-	-	(16.970)	(5.624)	390.233	454.575	195.582	-	-	-	-	-	-
Loan interest and fees (excl. rolled up)				(2.733.551)	-	(0)	(0)	(0)	-	-	-	(28.420)	(28.420)	(95.673)	(94.902)	(94.100)	(93.266)	(92.398)	(91.495)
EIB repayment				(700.000)	-	-	-	-	-	-	-	-	-	(18.977)	(19.747)	(20.549)	(21.383)	(22.251)	(23.155)
Senior debt repayment				(0)	-	-	-	-	-	-	-	-	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Total Financing				(1.311.818)	-	(0)	(0)	(0)	216.263	528.599	539.171	549.955	230.906	(114.649)	(114.649)	(114.649)	(114.649)	(114.649)	(114.649)
Net cash flow after financing				**652.722**	**-**	**(0)**	**(0)**	**(0)**	**-**	**-**	**-**	**-**	**-**	**(75.152)**	**(69.212)**	**(63.051)**	**(60.089)**	**(56.943)**	**(53.668)**
Interest on Cash Balance				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Interest on Overdraft				(1.898.987)	-	-	-	-	-	-	-	-	(0)	(1.999)	(5.945)	(9.780)	(13.576)	(17.411)	(21.280)
Dividends				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NET CASH FLOW			**FALSE**	**(1.246.264)**	**-**	**(0)**	**(0)**	**(0)**	**-**	**-**	**-**	**-**	**(0)**	**(77.151)**	**(75.158)**	**(72.831)**	**(73.665)**	**(74.354)**	**(74.948)**
Cash position begin period					-	-	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(77.151)	(152.309)	(225.140)	(298.804)	(373.159)
Net cash flow in period					-	(0)	(0)	(0)	-	-	-	-	(0)	(77.151)	(75.158)	(72.831)	(73.665)	(74.354)	(74.948)
Cash position end period			**TRUE**	-	-	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(77.151)	(152.309)	(225.140)	(298.804)	(373.159)	(448.106)

Calcs / Scenario Calculations																			
ArupSum basis tracé Sensitivity: Case 1: Base																			
Calculate	INPUT	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
CASH FLOW STATEMENT																			
Operating Cash Flow																			
Revenues		189.576	195.673	201.966	208.463	215.169	222.091	229.236	236.612	244.226	252.086	260.199	268.574	277.219	286.143	295.355	304.865	314.681	324.814
Availability Payment		(121.558)	(123.990)	(126.469)	(128.999)	(131.579)	(134.210)	(136.894)	(139.632)	(142.425)	(145.273)	(148.179)	(151.143)	(154.165)	(157.249)	(160.394)	(163.602)	(166.874)	(170.211)
Non deductable VAT on Availability Payments	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operational Expenses		(3.929)	(4.054)	(4.183)	(4.315)	(4.452)	(4.593)	(4.739)	(4.890)	(5.045)	(5.205)	(5.370)	(5.541)	(5.717)	(5.899)	(6.086)	(6.280)	(6.479)	(6.685)
Debtor cashflow		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Creditor cashflow		199	203	207	211	215	219	224	228	233	237	242	247	252	257	262	267	273	278
VAT cashflow		103	107	110	114	117	121	125	129	133	138	142	147	151	156	161	166	172	177
Total Operating Cash Flow		64.390	67.939	71.631	75.473	79.470	83.628	87.951	92.447	97.122	101.982	107.034	112.284	117.740	123.409	129.299	135.417	141.773	148.373
Capital Expenditure																			
Construction payments		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non deductable VAT on Construction Payments	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tax		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net cash flow before financing		**64.390**	**67.939**	**71.631**	**75.473**	**79.470**	**83.628**	**87.951**	**92.447**	**97.122**	**101.982**	**107.034**	**112.284**	**117.740**	**123.409**	**129.299**	**135.417**	**141.773**	**148.373**
Financing																			
Equity injection		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equity repayment		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EIB drawdown		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senior debt drawdown		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loan interest and fees (excl. rolled up)		(90.554)	(89.576)	(88.558)	(87.499)	(86.397)	(85.250)	(84.056)	(82.814)	(81.521)	(80.176)	(78.777)	(77.320)	(75.805)	(74.228)	(72.587)	(70.879)	(69.102)	(67.253)
EIB repayment		(24.095)	(25.073)	(26.091)	(27.150)	(28.253)	(29.400)	(30.593)	(31.835)	(33.128)	(34.473)	(35.872)	(37.329)	(38.844)	(40.422)	(42.063)	(43.770)	(45.547)	-
Senior debt repayment		(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	-
Total Financing		(114.649)	(114.649)	(114.649)	(114.649)	(114.649)	(114.649)	(114.649)	(114.649)	(114.649)	(114.649)	(114.649)	(114.649)	(114.649)	(114.649)	(114.649)	(114.649)	(114.649)	(67.253)
Net cash flow after financing		**(50.259)**	**(46.711)**	**(43.018)**	**(39.176)**	**(35.179)**	**(31.022)**	**(26.698)**	**(22.202)**	**(17.527)**	**(12.667)**	**(7.616)**	**(2.365)**	**3.090**	**8.760**	**14.649**	**20.768**	**27.123**	**81.121**
Interest on Cash Balance		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Interest on Overdraft		(25.176)	(29.095)	(33.030)	(36.973)	(40.918)	(44.856)	(48.777)	(52.673)	(56.532)	(60.343)	(64.092)	(67.768)	(71.354)	(74.834)	(78.193)	(81.411)	(84.468)	(86.082)
Dividends		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NET CASH FLOW		**(75.435)**	**(75.806)**	**(76.048)**	**(76.149)**	**(76.097)**	**(75.877)**	**(75.475)**	**(74.875)**	**(74.059)**	**(73.010)**	**(71.708)**	**(70.133)**	**(68.263)**	**(66.075)**	**(63.544)**	**(60.643)**	**(57.345)**	**(4.962)**
Cash position begin period		(448.106)	(523.542)	(599.347)	(675.395)	(751.544)	(827.641)	(903.518)	(978.993)	(1.053.868)	(1.127.927)	(1.200.937)	(1.272.645)	(1.342.778)	(1.411.042)	(1.477.116)	(1.540.660)	(1.601.303)	(1.658.647)
Net cash flow in period		(75.435)	(75.806)	(76.048)	(76.149)	(76.097)	(75.877)	(75.475)	(74.875)	(74.059)	(73.010)	(71.708)	(70.133)	(68.263)	(66.075)	(63.544)	(60.643)	(57.345)	(4.962)
Cash position end period		(523.542)	(599.347)	(675.395)	(751.544)	(827.641)	(903.518)	(978.993)	(1.053.868)	(1.127.927)	(1.200.937)	(1.272.645)	(1.342.778)	(1.411.042)	(1.477.116)	(1.540.660)	(1.601.303)	(1.658.647)	(1.663.609)

A 16.5 Uitkomsten Financieel model: ArupSum tracé: Basis

A 16.5.3 Niveau BAM entiteit

Calcs / Scenario Calculations																			
ArupSum basis tracé Sensitivity: Case 1: Base																			
Calculate	INPUT	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	
		34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	
CASH FLOW STATEMENT																			
Operating Cash Flow																			
Revenues		335.274	346.072	357.219	368.725	380.603	392.865	405.522	418.588	432.077	446.000	-	-	-	-	-	-	-	
Availability Payment		(173.615)	(177.088)	(180.629)	(184.242)	(187.927)	(191.685)	(195.519)	(199.429)	(203.418)	(207.486)	-	-	-	-	-	-	-	
Non deductable VAT on Availability Payments	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Operational Expenses		(6.898)	(7.117)	(7.344)	(7.578)	(7.819)	(8.068)	(8.325)	(8.590)	(8.864)	(9.146)	-	-	-	-	-	-	-	
Debtor cashflow		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Creditor cashflow		284	289	295	301	307	313	319	326	332	339	(17.291)	-	-	-	-	-	-	
VAT cashflow		183	189	195	201	208	215	222	229	236	244	(7.805)	-	-	-	-	-	-	
Total Operating Cash Flow		155.228	162.346	169.736	177.408	185.373	193.640	202.219	211.124	220.363	229.951	(25.096)	-	-	-	-	-	-	
Capital Expenditure																			
Construction payments		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Non deductable VAT on Construction Payments	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Capital Expenditure		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Tax		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Net cash flow before financing		**155.228**	**162.346**	**169.736**	**177.408**	**185.373**	**193.640**	**202.219**	**211.124**	**220.363**	**229.951**	**(25.096)**	**-**	**-**	**-**	**-**	**-**	**-**	
Financing																			
Equity injection		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Equity repayment		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EIB drawdown		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Senior debt drawdown		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Loan interest and fees (excl. rolled up)		(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	-	-	-	-	-	-	-	
EIB repayment		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Senior debt repayment		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Financing		(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	-	-	-	-	-	-	-	
Net cash flow after financing		**87.975**	**95.093**	**102.483**	**110.156**	**118.120**	**126.387**	**134.967**	**143.871**	**153.111**	**162.698**	**(25.096)**	**-**	**-**	**-**	**-**	**-**	**-**	
Interest on Cash Balance		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Interest on Overdraft		(86.164)	(85.878)	(85.191)	(84.067)	(82.468)	(80.351)	(77.674)	(74.389)	(70.446)	(65.794)	-	-	-	-	-	-	-	
Dividends		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NET CASH FLOW		**1.812**	**9.215**	**17.292**	**26.088**	**35.653**	**46.036**	**57.293**	**69.482**	**82.664**	**96.904**	**(25.096)**	**-**	**-**	**-**	**-**	**-**	**-**	
Cash position begin period		(1.663.609)	(1.661.797)	(1.652.582)	(1.635.290)	(1.609.202)	(1.573.549)	(1.527.513)	(1.470.220)	(1.400.737)	(1.318.073)	(1.221.169)	(1.246.264)	(1.246.264)	(1.246.264)	(1.246.264)	(1.246.264)	(1.246.264)	
Net cash flow in period		1.812	9.215	17.292	26.088	35.653	46.036	57.293	69.482	82.664	96.904	(25.096)	-	-	-	-	-	-	
Cash position end period		(1.661.797)	(1.652.582)	(1.635.290)	(1.609.202)	(1.573.549)	(1.527.513)	(1.470.220)	(1.400.737)	(1.318.073)	(1.221.169)	(1.246.264)	(1.246.264)	(1.246.264)	(1.246.264)	(1.246.264)	(1.246.264)	(1.246.264)	

Calcs / Scenario Calculations																		
ArupSum basis tracé Sensitivity: Case 1: Base																		
Calculate	INPUT		Check	TOTAL	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
			FALSE		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PROFIT AND LOSS STATEMENT																			
Revenues				9.561.880	-	-	-	-	-	-	-	-	142.214	150.222	158.493	167.035	172.405	177.948	183.670
Availability Payment				(5.290.609)	-	-	-	-	-	-	-	-	(105.824)	(107.940)	(110.099)	(112.301)	(114.547)	(116.838)	(119.175)
Operational Expenses				(197.066)	-	-	-	-	-	-	-	-	(2.926)	(3.101)	(3.282)	(3.469)	(3.578)	(3.692)	(3.809)
Depreciation of construction payments				(2.109.665)	-	-	-	-	-	-	-	-	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)
EBIT				1.964.540	-	-	-	-	-	-	-	-	(26.811)	(21.095)	(15.164)	(9.011)	(5.997)	(2.858)	410
Interest and fees on financing				(2.933.732)	-	(0)	(0)	(0)	(31.300)	(24.773)	(44.090)	(69.044)	(87.815)	(95.673)	(94.902)	(94.100)	(93.266)	(92.398)	(91.495)
Interest on Cash Balance / Overdraft				(1.898.987)	-	-	-	-	-	-	-	-	(0)	(1.999)	(5.945)	(9.780)	(13.576)	(17.411)	(21.280)
Result before taxes				(2.868.179)	-	(0)	(0)	(0)	(31.300)	(24.773)	(44.090)	(69.044)	(114.626)	(118.767)	(116.012)	(112.891)	(112.839)	(112.667)	(112.364)
Tax				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Profit after tax					-	(0)	(0)	(0)	(31.300)	(24.773)	(44.090)	(69.044)	(114.626)	(118.767)	(116.012)	(112.891)	(112.839)	(112.667)	(112.364)
Dividends				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NET Result				**(2.868.179)**	-	(0)	(0)	(0)	(31.300)	(24.773)	(44.090)	(69.044)	(114.626)	(118.767)	(116.012)	(112.891)	(112.839)	(112.667)	(112.364)
Unrepaid equity				464.383															
Check ending profit balance			FALSE	(1.621.914)															
BALANCE SHEET Extract																			
Fixed Assets																			
Construction payments					0	0	0	0	216.263	744.862	1.284.033	1.833.988	2.049.389	1.989.113	1.928.837	1.868.561	1.808.285	1.748.009	1.687.732
					0	0	0	0	216.263	744.862	1.284.033	1.833.988	2.049.389	1.989.113	1.928.837	1.868.561	1.808.285	1.748.009	1.687.732
Debtors					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cash Balance					0	0	0	0	0	0	0	0	0	-77.151	-152.309	-225.140	-298.804	-373.159	-448.106
TOTAL ASSETS					**0**	**0**	**0**	**0**	**216.263**	**744.862**	**1.284.033**	**1.833.988**	**2.049.389**	**1.911.962**	**1.776.528**	**1.643.421**	**1.509.480**	**1.374.850**	**1.239.626**
Equity					-	-	-	-	49.512	160.187	276.839	400.639	464.383	464.383	464.383	464.383	464.383	464.383	464.383
P&L Reserves					0	0	0	0	-31.300	-56.072	-100.162	-169.206	-283.832	-402.599	-518.611	-631.502	-744.341	-857.008	-969.372
EIB loan					-	-	-	-	198.050	640.748	700.000	700.000	700.000	681.023	661.276	640.727	619.344	597.093	573.938
Senior loan					0	0	0	0	0	0	407.356	902.555	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531
Creditor					-	-	-	-	-	-	-	-	8.819	8.995	9.175	9.358	9.546	9.737	9.931
VAT Creditor					-	-	-	-	-	-	-	-	2.489	2.629	2.774	2.923	3.017	3.114	3.214
Tax creditor					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL LIABILITIES					**0**	**0**	**0**	**0**	**216.263**	**744.862**	**1.284.033**	**1.833.988**	**2.049.389**	**1.911.962**	**1.776.528**	**1.643.421**	**1.509.480**	**1.374.850**	**1.239.626**
			TRUE		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

A 16.5 Uitkomsten Financieel model: ArupSum tracé: Basis

A 16.5.3 Niveau BAM entiteit

Calcs / Scenario Calculations																			
ArupSum basis tracé Sensitivity: Case 1: Base																			
Calculate	INPUT	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
PROFIT AND LOSS STATEMENT																			
Revenues		189.576	195.673	201.966	208.463	215.169	222.091	229.236	236.612	244.226	252.086	260.199	268.574	277.219	286.143	295.355	304.865	314.681	324.814
Availability Payment		(121.558)	(123.990)	(126.469)	(128.999)	(131.579)	(134.210)	(136.894)	(139.632)	(142.425)	(145.273)	(148.179)	(151.143)	(154.165)	(157.249)	(160.394)	(163.602)	(166.874)	(170.211)
Operational Expenses		(3.929)	(4.054)	(4.183)	(4.315)	(4.452)	(4.593)	(4.739)	(4.890)	(5.045)	(5.205)	(5.370)	(5.541)	(5.717)	(5.899)	(6.086)	(6.280)	(6.479)	(6.685)
Depreciation of construction payments		(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)
EBIT		**3.812**	**7.353**	**11.038**	**14.873**	**18.862**	**23.011**	**27.326**	**31.814**	**36.480**	**41.331**	**46.373**	**51.614**	**57.060**	**62.719**	**68.599**	**74.707**	**81.052**	**87.642**
Interest and fees on financing		(90.554)	(89.576)	(88.558)	(87.499)	(86.397)	(85.250)	(84.056)	(82.814)	(81.521)	(80.176)	(78.777)	(77.320)	(75.805)	(74.228)	(72.587)	(70.879)	(69.102)	(67.253)
Interest on Cash Balance / Overdraft		(25.176)	(29.095)	(33.030)	(36.973)	(40.918)	(44.856)	(48.777)	(52.673)	(56.532)	(60.343)	(64.092)	(67.768)	(71.354)	(74.834)	(78.193)	(81.411)	(84.468)	(86.082)
Result before taxes		**(111.918)**	**(111.318)**	**(110.550)**	**(109.599)**	**(108.453)**	**(107.094)**	**(105.507)**	**(103.673)**	**(101.573)**	**(99.188)**	**(96.496)**	**(93.474)**	**(90.098)**	**(86.343)**	**(82.180)**	**(77.582)**	**(72.518)**	**(65.693)**
Tax		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Profit after tax		(111.918)	(111.318)	(110.550)	(109.599)	(108.453)	(107.094)	(105.507)	(103.673)	(101.573)	(99.188)	(96.496)	(93.474)	(90.098)	(86.343)	(82.180)	(77.582)	(72.518)	(65.693)
Dividends		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NET Result		**(111.918)**	**(111.318)**	**(110.550)**	**(109.599)**	**(108.453)**	**(107.094)**	**(105.507)**	**(103.673)**	**(101.573)**	**(99.188)**	**(96.496)**	**(93.474)**	**(90.098)**	**(86.343)**	**(82.180)**	**(77.582)**	**(72.518)**	**(65.693)**
Unrepaid equity																			
Check ending profit balance																			
BALANCE SHEET Extract																			
Fixed Assets																			
Construction payments		1.627.456	1.567.180	1.506.904	1.446.628	1.386.352	1.326.075	1.265.799	1.205.523	1.145.247	1.084.971	1.024.695	964.419	904.142	843.866	783.590	723.314	663.038	602.762
		1.627.456	1.567.180	1.506.904	1.446.628	1.386.352	1.326.075	1.265.799	1.205.523	1.145.247	1.084.971	1.024.695	964.419	904.142	843.866	783.590	723.314	663.038	602.762
Debtors		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cash Balance		-523.542	-599.347	-675.395	-751.544	-827.641	-903.518	-978.993	-1.053.868	-1.127.927	-1.200.937	-1.272.645	-1.342.778	-1.411.042	-1.477.116	-1.540.660	-1.601.303	-1.658.647	-1.663.609
TOTAL ASSETS		**1.103.915**	**967.833**	**831.509**	**695.084**	**558.711**	**422.557**	**286.806**	**151.655**	**17.320**	**-115.966**	**-247.951**	**-378.360**	**-506.899**	**-633.250**	**-757.070**	**-877.989**	**-995.609**	**-1.060.847**
Equity		464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383
P&L Reserves		-1.081.291	-1.192.609	-1.303.158	-1.412.758	-1.521.211	-1.628.305	-1.733.812	-1.837.485	-1.939.058	-2.038.246	-2.134.742	-2.228.216	-2.318.314	-2.404.657	-2.486.837	-2.564.419	-2.636.937	-2.702.630
EIB loan		549.843	524.770	498.679	471.529	443.277	413.877	383.284	351.448	318.321	283.848	247.975	210.646	171.802	131.380	89.318	45.547	-	-
Senior loan		1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531
Creditor		10.130	10.332	10.539	10.750	10.965	11.184	11.408	11.636	11.869	12.106	12.348	12.595	12.847	13.104	13.366	13.633	13.906	14.184
VAT Creditor		3.318	3.424	3.534	3.648	3.765	3.887	4.012	4.141	4.274	4.411	4.553	4.700	4.851	5.008	5.169	5.335	5.507	5.684
Tax creditor		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL LIABILITIES		**1.103.915**	**967.833**	**831.509**	**695.084**	**558.711**	**422.557**	**286.806**	**151.655**	**17.320**	**-115.966**	**-247.951**	**-378.360**	**-506.899**	**-633.250**	**-757.070**	**-877.989**	**-995.609**	**-1.060.847**
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Calcs / Scenario Calculations																		
ArupSum basis tracé Sensitivity: Case 1: Base																		
Calculate	INPUT	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
		34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
PROFIT AND LOSS STATEMENT																		
Revenues		335.274	346.072	357.219	368.725	380.603	392.865	405.522	418.588	432.077	446.000	-	-	-	-	-	-	-
Availability Payment		(173.615)	(177.088)	(180.629)	(184.242)	(187.927)	(191.685)	(195.519)	(199.429)	(203.418)	(207.486)	-	-	-	-	-	-	-
Operational Expenses		(6.898)	(7.117)	(7.344)	(7.578)	(7.819)	(8.068)	(8.325)	(8.590)	(8.864)	(9.146)	-	-	-	-	-	-	-
Depreciation of construction payments		(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	(60.276)	-	-	-	-	-	-	-
EBIT		**94.485**	**101.591**	**108.970**	**116.630**	**124.582**	**132.836**	**141.402**	**150.293**	**159.519**	**169.092**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Interest and fees on financing		(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	(67.253)	-	-	-	-	-	-	-
Interest on Cash Balance / Overdraft		(86.164)	(85.878)	(85.191)	(84.067)	(82.468)	(80.351)	(77.674)	(74.389)	(70.446)	(65.794)	-	-	-	-	-	-	-
Result before taxes		**(58.931)**	**(51.539)**	**(43.474)**	**(34.690)**	**(25.139)**	**(14.768)**	**(3.524)**	**8.652**	**21.820**	**36.045**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Tax		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Profit after tax		(58.931)	(51.539)	(43.474)	(34.690)	(25.139)	(14.768)	(3.524)	8.652	21.820	36.045	-	-	-	-	-	-	-
Dividends		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NET Result		**(58.931)**	**(51.539)**	**(43.474)**	**(34.690)**	**(25.139)**	**(14.768)**	**(3.524)**	**8.652**	**21.820**	**36.045**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Unrepaid equity																		
Check ending profit balance																		
BALANCE SHEET Extract																		
Fixed Assets																		
Construction payments		542.485	482.209	421.933	361.657	301.381	241.105	180.828	120.552	60.276	0	0	0	0	0	0	0	0
		542.485	482.209	421.933	361.657	301.381	241.105	180.828	120.552	60.276	0	0	0	0	0	0	0	0
Debtors		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cash Balance		-1.661.797	-1.652.582	-1.635.290	-1.609.202	-1.573.549	-1.527.513	-1.470.220	-1.400.737	-1.318.073	-1.221.169	-1.246.264	-1.246.264	-1.246.264	-1.246.264	-1.246.264	-1.246.264	-1.246.264
TOTAL ASSETS		**-1.119.312**	**-1.170.373**	**-1.213.357**	**-1.247.545**	**-1.272.168**	**-1.286.408**	**-1.289.391**	**-1.280.185**	**-1.257.797**	**-1.221.169**	**-1.246.264**	**-1.246.264**	**-1.246.264**	**-1.246.264**	**-1.246.264**	**-1.246.264**	**-1.246.264**
Equity		464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383	464.383
P&L Reserves		-2.761.561	-2.813.101	-2.856.575	-2.891.265	-2.916.404	-2.931.172	-2.934.696	-2.926.044	-2.904.224	-2.868.179	-2.868.179	-2.868.179	-2.868.179	-2.868.179	-2.868.179	-2.868.179	-2.868.179
EIB loan		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senior loan		1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531	1.157.531
Creditor		14.468	14.757	15.052	15.353	15.661	15.974	16.293	16.619	16.951	17.291	-	-	-	-	-	-	-
VAT Creditor		5.867	6.056	6.251	6.453	6.661	6.875	7.097	7.325	7.561	7.805	-	-	-	-	-	-	-
Tax creditor		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL LIABILITIES		**-1.119.312**	**-1.170.373**	**-1.213.357**	**-1.247.545**	**-1.272.168**	**-1.286.408**	**-1.289.391**	**-1.280.185**	**-1.257.797**	**-1.221.169**	**-1.246.264**	**-1.246.264**	**-1.246.264**	**-1.246.264**	**-1.246.264**	**-1.246.264**	**-1.246.264**
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

A16.5.4 Samenvatting

Oosterweel — **In million EURO**

ARUP-SUM
ArupSum basis tracé
Sensitivity: Case 1: Base
25/06/2009

Calculate all scenarios | Calculate all sensitivites

Operational

Check	SVPCalcs	BAMCalcs	ProjectCalcs	OpCalcs
	TRUE	FALSE	FALSE	TRUE
End cash	-	(1.246,3)	(1.246,3)	
End retained profits	0,0	(2.868,2)	(2.868,2)	
Minimum cash	-	(1.663,6)	(1.658,6)	
Minimum retained profits	-	(2.934,7)	(2.934,7)	

Availability payment

Annual payment - unindexed	90,3

Finance

	SPV Bank Loan	BAM Bank Loan	EIB Loan (BAM)
Facility	415,5	1.157,5	700,0
Gearing	70%	50%	30%
Interest rate	5,81%	5,81%	4,06%
Arrangement fee	1,00%	1,00%	1,00%
Commitment fee	0,50%	0,50%	0,50%
Upfront costs	0,1	0,1	0,1
Loan term (years)	28	28	28
Repayment term (years)	23	23	23

Repayment type	Annuity	As soon as possible	Annuity
Repaid?	TRUE	FALSE	TRUE
Last repayment date	2040	0	2040
Remaining balance	-	1.157,5	-

Min ADSCR	2,249	0,587
Target ADSCR	1,150	1,150
Passed?	TRUE	FALSE

Min LLCR	3,366	-
Target LLCR	1,200	1,200
Passed?	TRUE	FALSE

Returns

	Project
Revenues (indexed)	9.561,9
Operating Costs (indexed)	(1.819,6)
Operating cash flow (indexed)	7.742,2
Capital expenditure (indexed)	(2.701,1)

	SPV	BAM	Project after tax	Project before tax
IRR	15,00%	#DIV/0!	4,76%	5,48%
NPV at 6,08%	260,7	(306,4)	(340,1)	(162,5)
NPV of dividends	363,9	-		

Investment	178,1	464,4
Dividends	1.822,3	-

Last cell

Calcs / Scenario Calculations													
Verfijnd A/S-tracé Sensitivity: Case 1: Base													
	INPUT		Check	TOTAL	2.009	2.010	2.011	2.012	2.013	2.014	2.015	2.016	2.017
			FALSE		1	2	3	4	5	6	7	8	9
CASH FLOW STATEMENT													
Operating Cash Flow													
Revenues				11.445.686	-	-	-	-	-	-	-	-	168.037
Operating costs during contruction				-	-	-	-	-	-	-	-	-	-
Operating costs during operations				(1.890.841)	-	-	-	-	-	-	-	-	(36.503)
Non deductable VAT on Availability Payments				-	-	-	-	-	-	-	-	-	-
Debtor cashflow				-	-	-	-	-	-	-	-	-	-
Creditor cashflow				-	-	-	-	-	401.097	8.022	8.182	8.346	(425.648)
VAT cashflow				(0)	-	-	-	-	(11.602)	(232)	(237)	(241)	14.676
Total Operating Cash Flow				9.554.845	-	-	-	-	389.495	7.790	7.946	8.105	(279.438)
Capital Expenditure													
Development costs				-	-	-	-	-	-	-	-	-	-
Construction costs				(2.732.506)	-	-	-	-	(662.971)	(676.230)	(689.755)	(703.550)	-
Non deductable VAT on Construction Payments				-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure				(2.732.506)	-	-	-	-	(662.971)	(676.230)	(689.755)	(703.550)	-
Tax				(1.281.626)	-	-	-	-	-	-	-	-	-
Net cash flow before financing				**5.540.714**	**-**	**-**	**-**	**-**	**(273.475)**	**(668.440)**	**(681.809)**	**(695.445)**	**(279.438)**
PROJECT RETURNS													
Operating cash flow				9.554.845	-	-	-	-	389.495	7.790	7.946	8.105	(279.438)
Capital expenditure				(2.732.506)	-	-	-	-	(662.971)	(676.230)	(689.755)	(703.550)	-
Tax				(1.281.626)	-	-	-	-	-	-	-	-	-
Total project cashflows before tax				6.822.339	-	-	-	-	(273.475)	(668.440)	(681.809)	(695.445)	(279.438)
Total project cashflows after tax				5.540.714	-	-	-	-	(273.475)	(668.440)	(681.809)	(695.445)	(279.438)
IRR before tax				6,79%									
IRR after tax				6,07%									
NPV before tax	6,08%			203.979									
NPV after tax				(3.293)									

A16.6 Uitkomsten Financieel model: ArupSum tracé: Refined

A 16.6.1 Project

Calcs / Scenario Calculations												
Verfijnd A/S-tracé Sensitivity: Case 1: Base												
	INPUT	2.018	2.019	2.020	2.021	2.022	2.023	2.024	2.025	2.026	2.027	2.028
		10	11	12	13	14	15	16	17	18	19	20
CASH FLOW STATEMENT												
Operating Cash Flow												
Revenues		178.801	189.928	201.428	207.813	214.402	221.201	228.217	235.457	242.929	250.640	258.597
Operating costs during contruction		-	-	-	-	-	-	-	-	-	-	-
Operating costs during operations		(37.406)	(38.330)	(39.276)	(40.110)	(40.963)	(41.834)	(42.725)	(43.635)	(44.565)	(45.516)	(46.487)
Non deductable VAT on Availability Payments		-	-	-	-	-	-	-	-	-	-	-
Debtor cashflow		-	-	-	-	-	-	-	-	-	-	-
Creditor cashflow		-	-	-	-	-	-	-	-	-	-	-
VAT cashflow		177	183	189	99	103	106	110	113	117	121	125
Total Operating Cash Flow		141.572	151.781	162.342	167.802	173.541	179.472	185.602	191.936	198.481	205.245	212.235
Capital Expenditure												
Development costs		-	-	-	-	-	-	-	-	-	-	-
Construction costs		-	-	-	-	-	-	-	-	-	-	-
Non deductable VAT on Construction Payments		-	-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure		-	-	-	-	-	-	-	-	-	-	-
Tax		(11.433)	(11.390)	(12.096)	(12.818)	(13.621)	(14.493)	(15.380)	(16.283)	(17.202)	(18.139)	(19.093)
Net cash flow before financing		**130.139**	**140.391**	**150.246**	**154.984**	**159.920**	**164.980**	**170.222**	**175.653**	**181.279**	**187.107**	**193.143**
PROJECT RETURNS												
Operating cash flow		141.572	151.781	162.342	167.802	173.541	179.472	185.602	191.936	198.481	205.245	212.235
Capital expenditure		-	-	-	-	-	-	-	-	-	-	-
Tax		(11.433)	(11.390)	(12.096)	(12.818)	(13.621)	(14.493)	(15.380)	(16.283)	(17.202)	(18.139)	(19.093)
Total project cashflows before tax		141.572	151.781	162.342	167.802	173.541	179.472	185.602	191.936	198.481	205.245	212.235
Total project cashflows after tax		130.139	140.391	150.246	154.984	159.920	164.980	170.222	175.653	181.279	187.107	193.143
IRR before tax												
IRR after tax												
NPV before tax	6,08%											
NPV after tax												

Calcs / Scenario Calculations														
Verfijnd A/S-tracé Sensitivity: Case 1: Base														
	INPUT	2.029	2.030	2.031	2.032	2.033	2.034	2.035	2.036	2.037	2.038	2.039	2.040	2.041
		21	22	23	24	25	26	27	28	29	30	31	32	33
CASH FLOW STATEMENT														
Operating Cash Flow														
Revenues		266.809	275.283	284.029	293.054	302.368	311.979	321.899	332.136	342.701	353.604	364.856	376.469	388.453
Operating costs during contruction		-	-	-	-	-	-	-	-	-	-	-	-	-
Operating costs during operations		(47.480)	(48.495)	(49.532)	(50.592)	(51.676)	(52.783)	(53.915)	(55.073)	(56.256)	(57.465)	(58.701)	(59.965)	(61.256)
Non deductable VAT on Availability Payments		-	-	-	-	-	-	-	-	-	-	-	-	-
Debtor cashflow		-	-	-	-	-	-	-	-	-	-	-	-	-
Creditor cashflow		-	-	-	-	-	-	-	-	-	-	-	-	-
VAT cashflow		129	134	138	143	147	152	157	163	168	174	179	185	192
Total Operating Cash Flow		219.458	226.922	234.635	242.604	250.839	259.348	268.141	277.226	286.613	296.313	306.335	316.690	327.388
Capital Expenditure														
Development costs		-	-	-	-	-	-	-	-	-	-	-	-	-
Construction costs		-	-	-	-	-	-	-	-	-	-	-	-	-
Non deductable VAT on Construction Payments		-	-	-	-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure		-	-	-	-	-	-	-	-	-	-	-	-	-
Tax		(20.064)	(21.055)	(22.065)	(23.094)	(24.144)	(25.215)	(26.308)	(27.423)	(28.562)	(29.726)	(30.914)	(32.128)	(33.369)
Net cash flow before financing		**199.394**	**205.867**	**212.570**	**219.510**	**226.695**	**234.133**	**241.833**	**249.803**	**258.051**	**266.587**	**275.421**	**284.562**	**294.020**
PROJECT RETURNS														
Operating cash flow		219.458	226.922	234.635	242.604	250.839	259.348	268.141	277.226	286.613	296.313	306.335	316.690	327.388
Capital expenditure		-	-	-	-	-	-	-	-	-	-	-	-	-
Tax		(20.064)	(21.055)	(22.065)	(23.094)	(24.144)	(25.215)	(26.308)	(27.423)	(28.562)	(29.726)	(30.914)	(32.128)	(33.369)
Total project cashflows before tax		219.458	226.922	234.635	242.604	250.839	259.348	268.141	277.226	286.613	296.313	306.335	316.690	327.388
Total project cashflows after tax		199.394	205.867	212.570	219.510	226.695	234.133	241.833	249.803	258.051	266.587	275.421	284.562	294.020
IRR before tax														
IRR after tax														
NPV before tax	6,08%													
NPV after tax														

A16.6 Uitkomsten Financieel model: ArupSum tracé: Refined

A 16.6.1 Project

Calcs / Scenario Calculations											
Verfijnd A/S-tracé Sensitivity: Case 1: Base											
	INPUT	2.042	2.043	2.044	2.045	2.046	2.047	2.048	2.049	2.050	2.051
		34	35	36	37	38	39	40	41	42	43
CASH FLOW STATEMENT											
Operating Cash Flow											
Revenues		400.822	413.587	426.760	440.357	454.388	468.870	483.816	499.242	515.162	531.593
Operating costs during contruction		-	-	-	-	-	-	-	-	-	-
Operating costs during operations		(62.577)	(63.927)	(65.307)	(66.719)	(68.161)	(69.637)	(71.145)	(72.687)	(74.264)	(75.877)
Non deductable VAT on Availability Payments		-	-	-	-	-	-	-	-	-	-
Debtor cashflow		-	-	-	-	-	-	-	-	-	-
Creditor cashflow		-	-	-	-	-	-	-	-	-	-
VAT cashflow		198	204	211	218	225	233	241	249	257	265
Total Operating Cash Flow		338.443	349.864	361.664	373.856	386.453	399.467	412.912	426.803	441.155	455.981
Capital Expenditure											
Development costs		-	-	-	-	-	-	-	-	-	-
Construction costs		-	-	-	-	-	-	-	-	-	-
Non deductable VAT on Construction Payments		-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure		-	-	-	-	-	-	-	-	-	-
Tax		(34.901)	(35.927)	(37.012)	(38.114)	(39.234)	(40.371)	(62.805)	(113.113)	(119.284)	(254.852)
Net cash flow before financing		**303.542**	**313.937**	**324.652**	**335.742**	**347.219**	**359.096**	**350.107**	**313.690**	**321.870**	**201.129**
PROJECT RETURNS											
Operating cash flow		338.443	349.864	361.664	373.856	386.453	399.467	412.912	426.803	441.155	455.981
Capital expenditure		-	-	-	-	-	-	-	-	-	-
Tax		(34.901)	(35.927)	(37.012)	(38.114)	(39.234)	(40.371)	(62.805)	(113.113)	(119.284)	(254.852)
Total project cashflows before tax		338.443	349.864	361.664	373.856	386.453	399.467	412.912	426.803	441.155	455.981
Total project cashflows after tax		303.542	313.937	324.652	335.742	347.219	359.096	350.107	313.690	321.870	201.129
IRR before tax											
IRR after tax											
NPV before tax	6,08%										
NPV after tax											

Calcs / Scenario Calculations																
Verfijnd A/S-tracé Sensitivity: Case 1: Base																
Calculate / Optimise Payment	INPUT		Check	TOTAL	2.009	2.010	2.011	2.012	2.013	2.014	2.015	2.016	2.017	2.018	2.019
			TRUE		1	2	3	4	5	6	7	8	9	10	11
CASH FLOW STATEMENT																
Operating Cash Flow																
Revenues : Construction payments				2.134.232	-	-	-	-	218.780	534.752	545.447	556.356	278.896	-	-
Revenues : Availability payments				5.357.905	-	-	-	-	-	-	-	-	107.170	109.313	111.500
Operating costs during contruction				-	-	-	-	-	-	-	-	-	-	-	-
Operating costs during operations				(1.647.171)	-	-	-	-	-	-	-	-	(32.947)	(33.606)	(34.278)
Debtor cashflow				-	-	-	-	-	-	-	-	-	(8.931)	(179)	(182)
Creditor cashflow				-	-	-	-	-	401.097	8.022	8.182	8.346	(425.648)	-	-
VAT cashflow				0	-	-	-	-	(11.602)	(232)	(237)	(241)	11.736	(12)	(12)
Total Operating Cash Flow				5.844.966	-	-	-	-	608.276	542.542	553.393	564.461	(69.724)	75.517	77.028
Capital Expenditure																
Development costs				-	-	-	-	-	-	-	-	-	-	-	-
Construction costs				(2.732.506)	-	-	-	-	(662.971)	(676.230)	(689.755)	(703.550)	-	-	-
				-											
Total Capital Expenditure				(2.732.506)	-	-	-	-	(662.971)	(676.230)	(689.755)	(703.550)	-	-	-
Tax				(949.661)	-	-	-	-	-	-	-	-	-	(11.433)	(11.390)
Net cash flow before financing				**2.162.800**	**-**	**-**	**-**	**-**	**(54.695)**	**(133.688)**	**(136.362)**	**(139.089)**	**(69.724)**	**64.084**	**65.638**
Financing																
Equity injection					-	-	-	-	18.644	42.227	44.601	47.079	27.585	-	-
Equity repayment					-	-	-	-	-	-	-	-	-	-	-
Debt drawdown				353.421	-	-	-	-	36.051	91.461	91.761	92.010	42.139	-	-
Loan interest and fees (excl. rolled up)				(352.076)	-	-	-	-	-	-	-	-	-	(24.421)	(23.888)
Repayments				(420.320)	-	-	-	-	-	-	-	-	-	(9.162)	(9.695)
Total Financing				(418.976)	-	-	-	-	54.695	133.688	136.362	139.089	69.724	(33.583)	(33.583)
Net cash flow after financing				**1.743.824**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**30.501**	**32.055**
Interest on Cash Balance				99.635	-	-	-	-	-	-	-	-	-	583	612
Interest on Overdraft				-	-	-	-	-	-	-	-	-	-	-	-
Dividends				(1.843.459)	-	-	-	-	-	-	-	-	-	(31.084)	(32.667)
NET CASH FLOW			**TRUE**	**0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Cash position begin period					-	-	-	-	-	-	-	-	-	-	-
Net cash flow in period					-	-	-	-	-	-	-	-	-	-	-
Cash position end period			**TRUE**	-	-	-	-	-	-	-	-	-	-	-	-

A 16.6 Uitkomsten Financieel model: ArupSum Tracé: Refined

A 16.6.2 Niveau SPV entiteit

Calcs / Scenario Calculations															
Verfijnd A/S-tracé Sensitivity: Case 1: Base															
Calculate / Optimise Payment	INPUT	2.020	2.021	2.022	2.023	2.024	2.025	2.026	2.027	2.028	2.029	2.030	2.031	2.032	2.033
		12	13	14	15	16	17	18	19	20	21	22	23	24	25
CASH FLOW STATEMENT															
Operating Cash Flow															
Revenues : Construction payments		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Revenues : Availability payments		113.730	116.004	118.324	120.691	123.105	125.567	128.078	130.640	133.252	135.917	138.636	141.408	144.237	147.121
Operating costs during contruction		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operating costs during operations		(34.964)	(35.663)	(36.376)	(37.104)	(37.846)	(38.603)	(39.375)	(40.162)	(40.966)	(41.785)	(42.621)	(43.473)	(44.342)	(45.229)
Debtor cashflow		(186)	(190)	(193)	(197)	(201)	(205)	(209)	(213)	(218)	(222)	(227)	(231)	(236)	(240)
Creditor cashflow		-	-	-	-	-	-	-	-	-	-	-	-	-	-
VAT cashflow		(12)	(12)	(12)	(13)	(13)	(13)	(14)	(14)	(14)	(14)	(15)	(15)	(15)	(16)
Total Operating Cash Flow		78.568	80.139	81.742	83.377	85.045	86.746	88.480	90.250	92.055	93.896	95.774	97.690	99.643	101.636
Capital Expenditure															
Development costs		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Construction costs		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tax		(12.096)	(12.818)	(13.621)	(14.493)	(15.380)	(16.283)	(17.202)	(18.139)	(19.093)	(20.064)	(21.055)	(22.065)	(23.094)	(24.144)
Net cash flow before financing		**66.472**	**67.322**	**68.121**	**68.884**	**69.665**	**70.463**	**71.278**	**72.111**	**72.962**	**73.832**	**74.719**	**75.625**	**76.549**	**77.492**
Financing															
Equity injection		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equity repayment		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Debt drawdown		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loan interest and fees (excl. rolled up)		(23.325)	(22.729)	(22.098)	(21.431)	(20.725)	(19.978)	(19.188)	(18.351)	(17.466)	(16.530)	(15.539)	(14.491)	(13.381)	(12.208)
Repayments		(10.258)	(10.854)	(11.484)	(12.152)	(12.858)	(13.605)	(14.395)	(15.232)	(16.117)	(17.053)	(18.044)	(19.092)	(20.202)	(21.375)
Total Financing		(33.583)	(33.583)	(33.583)	(33.583)	(33.583)	(33.583)	(33.583)	(33.583)	(33.583)	(33.583)	(33.583)	(33.583)	(33.583)	(33.583)
Net cash flow after financing		**32.890**	**33.739**	**34.538**	**35.302**	**36.082**	**36.880**	**37.695**	**38.528**	**39.380**	**40.249**	**41.136**	**42.042**	**42.966**	**43.909**
Interest on Cash Balance		628	820	1.146	1.449	1.727	1.979	2.204	2.399	2.562	2.693	2.789	2.849	2.869	2.847
Interest on Overdraft		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dividends		(28.913)	(26.441)	(28.133)	(29.855)	(31.608)	(33.393)	(35.210)	(37.062)	(38.949)	(40.871)	(42.831)	(44.830)	(46.868)	(48.947)
NET CASH FLOW		**4.605**	**8.118**	**7.551**	**6.895**	**6.201**	**5.466**	**4.688**	**3.865**	**2.993**	**2.071**	**1.095**	**61**	**(1.033)**	**(2.190)**
Cash position begin period		-	4.605	12.722	20.273	27.169	33.370	38.836	43.524	47.389	50.382	52.453	53.548	53.609	52.576
Net cash flow in period		4.605	8.118	7.551	6.895	6.201	5.466	4.688	3.865	2.993	2.071	1.095	61	(1.033)	(2.190)
Cash position end period		4.605	12.722	20.273	27.169	33.370	38.836	43.524	47.389	50.382	52.453	53.548	53.609	52.576	50.386

Calcs / Scenario Calculations													
Verfijnd A/S-tracé Sensitivity: Case 1: Base													
Calculate / Optimise Payment	INPUT	2.034	2.035	2.036	2.037	2.038	2.039	2.040	2.041	2.042	2.043	2.044	2.045
		26	27	28	29	30	31	32	33	34	35	36	37
CASH FLOW STATEMENT													
Operating Cash Flow													
Revenues : Construction payments		-	-	-	-	-	-	-	-	-	-	-	-
Revenues : Availability payments		150.064	153.065	156.126	159.249	162.434	165.683	168.996	172.376	175.824	179.340	182.927	186.585
Operating costs during contruction		-	-	-	-	-	-	-	-	-	-	-	-
Operating costs during operations		(46.134)	(47.057)	(47.998)	(48.958)	(49.937)	(50.935)	(51.954)	(52.993)	(54.053)	(55.134)	(56.237)	(57.362)
Debtor cashflow		(245)	(250)	(255)	(260)	(265)	(271)	(276)	(282)	(287)	(293)	(299)	(305)
Creditor cashflow		-	-	-	-	-	-	-	-	-	-	-	-
VAT cashflow		(16)	(16)	(16)	(17)	(17)	(17)	(18)	(18)	(19)	(19)	(19)	(20)
Total Operating Cash Flow		103.669	105.742	107.857	110.014	112.215	114.459	116.748	119.083	121.465	123.894	126.372	128.899
Capital Expenditure													
Development costs		-	-	-	-	-	-	-	-	-	-	-	-
Construction costs		-	-	-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure		-	-	-	-	-	-	-	-	-	-	-	-
Tax		(25.215)	(26.308)	(27.423)	(28.562)	(29.726)	(30.914)	(32.128)	(33.369)	(34.901)	(35.927)	(37.012)	(38.114)
Net cash flow before financing		**78.454**	**79.434**	**80.434**	**81.452**	**82.489**	**83.545**	**84.620**	**85.714**	**86.564**	**87.967**	**89.360**	**90.785**
Financing													
Equity injection		-	-	-	-	-	-	-	-	-	-	-	-
Equity repayment		-	-	-	-	-	-	-	-	-	-	-	-
Debt drawdown		-	-	-	-	-	-	-	-	-	-	-	-
Loan interest and fees (excl. rolled up)		(10.966)	(9.651)	(8.261)	(6.789)	(5.233)	(3.585)	(1.842)	-	-	-	-	-
Repayments		(22.617)	(23.931)	(25.322)	(26.793)	(28.350)	(29.998)	(31.731)	-	-	-	-	-
Total Financing		(33.583)	(33.583)	(33.583)	(33.583)	(33.583)	(33.583)	(33.573)	-	-	-	-	-
Net cash flow after financing		**44.871**	**45.851**	**46.851**	**47.869**	**48.906**	**49.962**	**51.047**	**85.714**	**86.564**	**87.967**	**89.360**	**90.785**
Interest on Cash Balance		2.782	2.670	2.509	2.296	2.028	1.702	1.313	1.637	2.266	3.022	3.780	4.539
Interest on Overdraft		-	-	-	-	-	-	-	-	-	-	-	-
Dividends		(51.068)	(53.234)	(55.445)	(57.703)	(60.009)	(62.366)	(61.220)	(71.304)	(69.740)	(71.847)	(73.986)	(76.159)
NET CASH FLOW		**(3.416)**	**(4.712)**	**(6.085)**	**(7.537)**	**(9.075)**	**(10.702)**	**(8.859)**	**16.047**	**19.090**	**19.143**	**19.154**	**19.165**
Cash position begin period		50.386	46.971	42.258	36.174	28.636	19.561	8.859	-	16.047	35.137	54.280	73.434
Net cash flow in period		(3.416)	(4.712)	(6.085)	(7.537)	(9.075)	(10.702)	(8.859)	16.047	19.090	19.143	19.154	19.165
Cash position end period		46.971	42.258	36.174	28.636	19.561	8.859	-	16.047	35.137	54.280	73.434	92.599

A 16.6 Uitkomsten Financieel model: ArupSum Tracé: Refined

A 16.6.2 Niveau SPV entiteit

Calcs / Scenario Calculations														
Verfijnd A/S-tracé Sensitivity: Case 1: Base														
Calculate / Optimise Payment	INPUT	2.046	2.047	2.048	2.049	2.050	2.051	2.052	2.053	2.054	2.055	2.056	2.057	2.058
		38	39	40	41	42	43	44	45	46	47	48	49	50
CASH FLOW STATEMENT														
Operating Cash Flow														
Revenues : Construction payments		-	-	-	-	-	-	-	-	-	-	-	-	-
Revenues : Availability payments		190.317	194.124	198.006	201.966	206.005	210.126	-	-	-	-	-	-	-
Operating costs during contruction		-	-	-	-	-	-	-	-	-	-	-	-	-
Operating costs during operations		(58.509)	(59.679)	(60.873)	(62.090)	(63.332)	(64.599)	-	-	-	-	-	-	-
Debtor cashflow		(311)	(317)	(324)	(330)	(337)	(343)	17.510	-	-	-	-	-	-
Creditor cashflow		-	-	-	-	-	-	-	-	-	-	-	-	-
VAT cashflow		(20)	(20)	(21)	(21)	(22)	(22)	1.130	-	-	-	-	-	-
Total Operating Cash Flow		131.477	134.107	136.789	139.525	142.315	145.162	18.641	-	-	-	-	-	-
Capital Expenditure														
Development costs		-	-	-	-	-	-	-	-	-	-	-	-	-
Construction costs		-	-	-	-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure		-	-	-	-	-	-	-	-	-	-	-	-	-
Tax		(39.234)	(40.371)	(41.526)	(42.699)	(43.891)	(89.974)	-	-	-	-	-	-	-
Net cash flow before financing		**92.244**	**93.736**	**95.263**	**96.826**	**98.424**	**55.188**	**18.641**	**-**	**-**	**-**	**-**	**-**	**-**
Financing														
Equity injection		-	-	-	-	-	-	-	-	-	-	-	-	-
Equity repayment		-	-	-	-	-	(180.137)	-	-	-	-	-	-	-
Debt drawdown		-	-	-	-	-	-	-	-	-	-	-	-	-
Loan interest and fees (excl. rolled up)		-	-	-	-	-	-	-	-	-	-	-	-	-
Repayments		-	-	-	-	-	-	-	-	-	-	-	-	-
Total Financing		-	-	-	-	-	(180.137)	-	-	-	-	-	-	-
Net cash flow after financing		**92.244**	**93.736**	**95.263**	**96.826**	**98.424**	**(124.949)**	**18.641**	**-**	**-**	**-**	**-**	**-**	**-**
Interest on Cash Balance		5.299	6.060	6.822	7.586	8.350	4.818	-	-	-	-	-	-	-
Interest on Overdraft		-	-	-	-	-	-	-	-	-	-	-	-	-
Dividends		(78.367)	(80.609)	(82.887)	(85.200)	(87.551)	(68.462)	(18.641)	-	-	-	-	-	-
NET CASH FLOW		**19.176**	**19.187**	**19.199**	**19.211**	**19.223**	**(188.594)**	**0**	**-**	**-**	**-**	**-**	**-**	**-**
Cash position begin period		92.599	111.775	130.962	150.161	169.371	188.594	-	0	0	0	0	0	0
Net cash flow in period		19.176	19.187	19.199	19.211	19.223	(188.594)	0	-	-	-	-	-	-
Cash position end period		111.775	130.962	150.161	169.371	188.594	-	0	0	0	0	0	0	0

PROFIT AND LOSS STATEMENT															
				TOTAL	2.009	2.010	2.011	2.012	2.013	2.014	2.015	2.016	2.017	2.018	2.019
Revenues															
a) Construction payments (deferred)				2.134.232	-	-	-	-	-	-	-	-	60.978	60.978	60.978
b) Availability payments				5.357.905	-	-	-	-	-	-	-	-	107.170	109.313	111.500
Operating costs during operations				(1.647.171)	-	-	-	-	-	-	-	-	(32.947)	(33.606)	(34.278)
Deffered costs (Depreciation Capex)				(2.777.178)	-	-	-	-	-	-	-	-	(79.348)	(79.348)	(79.348)
EBIT				3.067.788	-	-	-	-	-	-	-	-	**55.853**	**57.337**	**58.852**
Interest and fees on financing				(374.303)	-	-	-	-	-	-	-	-	(22.227)	(24.421)	(23.888)
Interest on Cash Balance / Overdraft				99.635	-	-	-	-	-	-	-	-	-	583	612
Result before taxes				2.793.120	-	-	-	-	-	-	-	-	**33.626**	**33.499**	**35.576**
Tax				(949.661)	-	-	-	-	-	-	-	-	(11.433)	(11.390)	(12.096)
Profit after tax					-	-	-	-	-	-	-	-	22.193	22.110	23.480
Dividends				(1.843.459)	-	-	-	-	-	-	-	-	-	(31.084)	(32.667)
NET Result				-	-	-	-	-	-	-	-	-	**22.193**	**(8.974)**	**(9.187)**
Non depreciated LAND				-											
Net cash flow				-											
			TRUE	(0)											

BALANCE SHEET Extract															
				TOTAL	2.009	2.010	2.011	2.012	2.013	2.014	2.015	2.016	2.017	2.018	2.019
Work in progress / Deferred costs															
Land					0	0	0	0	0	0	0	0	0	0	0
Capex					0	0	0	0	670.423	1.353.722	2.055.786	2.777.178	2.697.830	2.618.482	2.539.134
					0	0	0	0	670.423	1.353.722	2.055.786	2.777.178	2.697.830	2.618.482	2.539.134
Debtors					-	-	-	-	-	-	-	-	8.931	9.109	9.292
Cash Balance					0	0	0	0	0	0	0	0	0	0	0
TOTAL ASSETS					**0**	**0**	**0**	**0**	**670.423**	**1.353.722**	**2.055.786**	**2.777.178**	**2.706.761**	**2.627.591**	**2.548.426**
Equity					-	-	-	-	18.644	60.871	105.472	152.552	180.137	180.137	180.137
P&L Reserves					0	0	0	0	0	0	0	0	22.193	13.219	4.032
Deferred income					-	-	-	-	218.780	753.533	1.298.980	1.855.336	2.073.254	2.012.276	1.951.298
Loan					0	0	0	0	43.503	142.033	246.102	355.954	420.320	411.158	401.463
Creditor					-	-	-	-	401.097	409.119	417.302	425.648	-	-	-
VAT Creditor					-	-	-	-	(11.602)	(11.834)	(12.071)	(12.312)	(577)	(588)	(600)
Tax creditor					0	0	0	0	0	0	0	0	11.433	11.390	12.096
TOTAL LIABILITIES					**0**	**0**	**0**	**0**	**670.423**	**1.353.722**	**2.055.786**	**2.777.178**	**2.706.761**	**2.627.591**	**2.548.426**
			TRUE		0	0	0	0	0	0	0	0	0	0	0

A 16.6 Uitkomsten Financieel model: ArupSum Tracé: Refined

A 16.6.2 Niveau SPV entiteit

PROFIT AND LOSS STATEMENT															
		2.020	2.021	2.022	2.023	2.024	2.025	2.026	2.027	2.028	2.029	2.030	2.031	2.032	2.033
Revenues															
a) Construction payments (deferred)		60.978	60.978	60.978	60.978	60.978	60.978	60.978	60.978	60.978	60.978	60.978	60.978	60.978	60.978
b) Availability payments		113.730	116.004	118.324	120.691	123.105	125.567	128.078	130.640	133.252	135.917	138.636	141.408	144.237	147.121
Operating costs during operations		(34.964)	(35.663)	(36.376)	(37.104)	(37.846)	(38.603)	(39.375)	(40.162)	(40.966)	(41.785)	(42.621)	(43.473)	(44.342)	(45.229)
Deffered costs (Depreciation Capex)		(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)
EBIT		**60.396**	**61.971**	**63.578**	**65.217**	**66.889**	**68.594**	**70.333**	**72.107**	**73.917**	**75.763**	**77.645**	**79.566**	**81.524**	**83.522**
Interest and fees on financing		(23.325)	(22.729)	(22.098)	(21.431)	(20.725)	(19.978)	(19.188)	(18.351)	(17.466)	(16.530)	(15.539)	(14.491)	(13.381)	(12.208)
Interest on Cash Balance / Overdraft		628	820	1.146	1.449	1.727	1.979	2.204	2.399	2.562	2.693	2.789	2.849	2.869	2.847
Result before taxes		**37.699**	**40.063**	**42.625**	**45.235**	**47.891**	**50.595**	**53.349**	**56.155**	**59.013**	**61.926**	**64896**	**67.923**	**71.012**	**74.162**
Tax		(12.818)	(13.621)	(14.493)	(15.380)	(16.283)	(17.202)	(18.139)	(19.093)	(20.064)	(21.055)	(22.065)	(23.094)	(24.144)	(25.215)
Profit after tax		24.881	26.441	28.133	29.855	31.608	33.393	35.210	37.062	38.949	40.871	42.831	44.830	46.868	48.947
Dividends		(28.913)	(26.441)	(28.133)	(29.855)	(31.608)	(33.393)	(35.210)	(37.062)	(38.949)	(40.871)	(42.831)	(44.830)	(46.868)	(48.947)
NET Result		**(4.032)**	-	-	-	-	-	-	-	-	-	-	-	-	-
Non depreciated LAND															
Net cash flow															

BALANCE SHEET Extract															
		2.020	2.021	2.022	2.023	2.024	2.025	2.026	2.027	2.028	2.029	2.030	2.031	2.032	2.033
Work in progress / Deferred costs															
Land		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capex		2.459.786	2.380.438	2.301.090	2.221.742	2.142.394	2.063.046	1.983.698	1.904.351	1.825.003	1.745.655	1.666.307	1.586.959	1.507.611	1.428.263
		2.459.786	2.380.438	2.301.090	2.221.742	2.142.394	2.063.046	1.983.698	1.904.351	1.825.003	1.745.655	1.666.307	1.586.959	1.507.611	1.428.263
Debtors		9.477	9.667	9.860	10.058	10.259	10.464	10.673	10.887	11.104	11.326	11.553	11.784	12.020	12.260
Cash Balance		4.605	12.722	20.273	27.169	33.370	38.836	43.524	47.389	50.382	52.453	53.548	53.609	52.576	50.386
TOTAL ASSETS		**2.473.868**	**2.402.828**	**2.331.224**	**2.258.969**	**2.186.023**	**2.112.346**	**2.037.896**	**1.962.626**	**1.886.489**	**1.809.434**	**1.731.408**	**1.652.352**	**1.572.207**	**1.490.909**
Equity		180.137	180.137	180.137	180.137	180.137	180.137	180.137	180.137	180.137	180.137	180.137	180.137	180.137	180.137
P&L Reserves		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deferred income		1.890.320	1.829.342	1.768.364	1.707.386	1.646.408	1.585.430	1.524.451	1.463.473	1.402.495	1.341.517	1.280.539	1.219.561	1.158.583	1.097.605
Loan		391.205	380.351	368.867	356.715	343.858	330.253	315.858	300.626	284.509	267.456	249.413	230.320	210.119	188.744
Creditor		-	-	-	-	-	-	-	-	-	-	-	-	-	-
VAT Creditor		(612)	(624)	(637)	(649)	(662)	(676)	(689)	(703)	(717)	(731)	(746)	(761)	(776)	(792)
Tax creditor		12.818	13.621	14.493	15.380	16.283	17.202	18.139	19.093	20.064	21.055	22.065	23.094	24.144	25.215
TOTAL LIABILITIES		**2.473.868**	**2.402.828**	**2.331.224**	**2.258.969**	**2.186.023**	**2.112.346**	**2.037.896**	**1.962.626**	**1.886.489**	**1.809.434**	**1.731.408**	**1.652.352**	**1.572.207**	**1.490.909**
		0	0	0	0	0	0	0	0	0	0	0	0	0	0

PROFIT AND LOSS STATEMENT													
		2.034	2.035	2.036	2.037	2.038	2.039	2.040	2.041	2.042	2.043	2.044	2.045
Revenues													
a) Construction payments (deferred)		60.978	60.978	60.978	60.978	60.978	60.978	60.978	60.978	60.978	60.978	60.978	60.978
b) Availability payments		150.064	153.065	156.126	159.249	162.434	165.683	168.996	172.376	175.824	179.340	182.927	186.585
Operating costs during operations		(46.134)	(47.057)	(47.998)	(48.958)	(49.937)	(50.935)	(51.954)	(52.993)	(54.053)	(55.134)	(56.237)	(57.362)
Deffered costs (Depreciation Capex)		(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)
EBIT		**85.560**	**87.639**	**89.759**	**91.921**	**94.127**	**96.377**	**98.672**	**101.013**	**103.401**	**105.836**	**108.320**	**110.854**
Interest and fees on financing		(10.966)	(9.651)	(8.261)	(6.789)	(5.233)	(3.585)	(1.842)	-	-	-	-	-
Interest on Cash Balance / Overdraft		2.782	2.670	2.509	2.296	2.028	1.702	1.313	1.637	2.266	3.022	3.780	4.539
Result before taxes		**77.376**	**80.657**	**84.007**	**87.428**	**90.923**	**94.494**	**98.144**	**102.650**	**105.667**	**108.858**	**112.100**	**115.393**
Tax		(26.308)	(27.423)	(28.562)	(29.726)	(30.914)	(32.128)	(33.369)	(34.901)	(35.927)	(37.012)	(38.114)	(39.234)
Profit after tax		51.068	53.234	55.445	57.703	60.009	62.366	64.775	67.749	69.740	71.847	73.986	76.159
Dividends		(51.068)	(53.234)	(55.445)	(57.703)	(60.009)	(62.366)	(61.220)	(71.304)	(69.740)	(71.847)	(73.986)	(76.159)
NET Result		**-**	**-**	**-**	**-**	**-**	**-**	**3.555**	**(3.555)**	**-**	**-**	**-**	**-**
Non depreciated LAND													
Net cash flow													
BALANCE SHEET Extract													
		2.034	**2.035**	**2.036**	**2.037**	**2.038**	**2.039**	**2.040**	**2.041**	**2.042**	**2.043**	**2.044**	**2.045**
Work in progress / Deferred costs													
Land		0	0	0	0	0	0	0	0	0	0	0	0
Capex		1.348.915	1.269.567	1.190.219	1.110.871	1.031.523	952.175	872.827	793.479	714.131	634.784	555.436	476.088
		1.348.915	1.269.567	1.190.219	1.110.871	1.031.523	952.175	872.827	793.479	714.131	634.784	555.436	476.088
Debtors		12.505	12.755	13.011	13.271	13.536	13.807	14.083	14.365	14.652	14.945	15.244	15.549
Cash Balance		46.971	42.258	36.174	28.636	19.561	8.859	0	16.047	35.137	54.280	73.434	92.599
TOTAL ASSETS		**1.408.391**	**1.324.581**	**1.239.403**	**1.152.778**	**1.064.621**	**974.842**	**886.910**	**823.891**	**763.921**	**704.009**	**644.114**	**584.235**
Equity		180.137	180.137	180.137	180.137	180.137	180.137	180.137	180.137	180.137	180.137	180.137	180.137
P&L Reserves		0	0	0	0	0	0	3.555	0	0	0	0	0
Deferred income		1.036.627	975.649	914.671	853.693	792.715	731.737	670.759	609.781	548.803	487.824	426.846	365.868
Loan		166.126	142.195	116.873	90.079	61.729	31.731	0	0	0	0	0	0
Creditor		-	-	-	-	-	-	-	-	-	-	-	-
VAT Creditor		(807)	(823)	(840)	(857)	(874)	(891)	(909)	(927)	(946)	(965)	(984)	(1.004)
Tax creditor		26.308	27.423	28.562	29.726	30.914	32.128	33.369	34.901	35.927	37.012	38.114	39.234
TOTAL LIABILITIES		**1.408.391**	**1.324.581**	**1.239.403**	**1.152.778**	**1.064.621**	**974.842**	**886.910**	**823.891**	**763.921**	**704.009**	**644.114**	**584.235**
		0	0	0	0	0	0	0	0	0	0	0	0

A 16.6 Uitkomsten Financieel model: ArupSum Tracé: Refined

A 16.6.2 Niveau SPV entiteit

PROFIT AND LOSS STATEMENT														
		2.046	2.047	2.048	2.049	2.050	2.051	2.052	2.053	2.054	2.055	2.056	2.057	2.058
Revenues														
a) Construction payments (deferred)		60.978	60.978	60.978	60.978	60.978	60.978	-	-	-	-	-	-	-
b) Availability payments		190.317	194.124	198.006	201.966	206.005	210.126	-	-	-	-	-	-	-
Operating costs during operations		(58.509)	(59.679)	(60.873)	(62.090)	(63.332)	(64.599)	-	-	-	-	-	-	-
Deffered costs (Depreciation Capex)		(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	(79.348)	-	-	-	-	-	-	-
EBIT		**113.438**	**116.075**	**118.763**	**121.506**	**124.304**	**127.157**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Interest and fees on financing		-	-	-	-	-	-	-	-	-	-	-	-	-
Interest on Cash Balance / Overdraft		5.299	6.060	6.822	7.586	8.350	4.818	-	-	-	-	-	-	-
Result before taxes		**118.738**	**122.135**	**125.586**	**129.092**	**132.654**	**131.975**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Tax		(40.371)	(41.526)	(42.699)	(43.891)	(45.102)	(44.871)	-	-	-	-	-	-	-
Profit after tax		78.367	80.609	82.887	85.200	87.551	87.103	-	-	-	-	-	-	-
Dividends		(78.367)	(80.609)	(82.887)	(85.200)	(87.551)	(68.462)	(18.641)	-	-	-	-	-	-
NET Result		**-**	**-**	**-**	**-**	**-**	**18.641**	**(18.641)**	**-**	**-**	**-**	**-**	**-**	**-**
Non depreciated LAND														
Net cash flow														
BALANCE SHEET Extract														
		2.046	2.047	2.048	2.049	2.050	2.051	2.052	2.053	2.054	2.055	2.056	2.057	2.058
Work in progress / Deferred costs														
Land		0	0	0	0	0	0	0	0	0	0	0	0	0
Capex		396.740	317.392	238.044	158.696	79.348	0	0	0	0	0	0	0	0
		396.740	317.392	238.044	158.696	79.348	0	0	0	0	0	0	0	0
Debtors		15.860	16.177	16.500	16.831	17.167	17.510	-	-	-	-	-	-	-
Cash Balance		111.775	130.962	150.161	169.371	188.594	0	0	0	0	0	0	0	0
TOTAL ASSETS		**524.374**	**464.531**	**404.705**	**344.898**	**285.109**	**17.510**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Equity		180.137	180.137	180.137	180.137	180.137	-	-	-	-	-	-	-	-
P&L Reserves		0	0	0	0	0	18.641	0	0	0	0	0	0	0
Deferred income		304.890	243.912	182.934	121.956	60.978	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Loan		0	0	0	0	0	0	0	0	0	0	0	0	0
Creditor		-	-	-	-	-	-	-	-	-	-	-	-	-
VAT Creditor		(1.024)	(1.044)	(1.065)	(1.087)	(1.108)	(1.130)	-	-	-	-	-	-	-
Tax creditor		40.371	41.526	42.699	43.891	45.102	0	0	0	0	0	0	0	0
TOTAL LIABILITIES		**524.374**	**464.531**	**404.705**	**344.898**	**285.109**	**17.510**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
		0	0	0	0	0	0	0	0	0	0	0	0	0

Calcs / Scenario Calculations																			
Verfijnd A/S-tracé Sensitivity: Case 1: Base																			
Calculate	INPUT		Check	TOTAL	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
			FALSE		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CASH FLOW STATEMENT																			
Operating Cash Flow																			
Revenues				11.445.686	-	-	-	-	-	-	-	-	168.037	178.801	189.928	201.428	207.813	214.402	221.201
Availability Payment				(5.357.905)	-	-	-	-	-	-	-	-	(107.170)	(109.313)	(111.500)	(113.730)	(116.004)	(118.324)	(120.691)
Non deductable VAT on Availability Payments	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operational Expenses				(243.670)	-	-	-	-	-	-	-	-	(3.556)	(3.800)	(4.052)	(4.312)	(4.447)	(4.587)	(4.731)
Debtor cashflow				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Creditor cashflow				-	-	-	-	-	-	-	-	-	8.931	179	182	186	190	193	197
VAT cashflow				-	-	-	-	-	-	-	-	-	2.941	188	195	201	112	115	119
Total Operating Cash Flow				5.844.111	-	-	-	-	-	-	-	-	69.182	66.055	74.753	83.774	87.663	91.799	96.095
Capital Expenditure																			
Construction payments				(2.134.232)	-	-	-	-	(218.780)	(534.752)	(545.447)	(556.356)	(278.896)	-	-	-	-	-	-
Non deductable VAT on Construction Payments	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure				(2.134.232)	-	-	-	-	(218.780)	(534.752)	(545.447)	(556.356)	(278.896)	-	-	-	-	-	-
Tax				(331.965)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net cash flow before financing				**3.377.914**	**-**	**-**	**-**	**-**	**(218.780)**	**(534.752)**	**(545.447)**	**(556.356)**	**(209.714)**	**66.055**	**74.753**	**83.774**	**87.663**	**91.799**	**96.095**
Financing																			
Equity injection				464.818	-	-	-	-	50.029	111.941	118.001	125.244	59.603	-	-	-	-	-	-
Equity repayment				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EIB drawdown				639.235	-	-	-	-	185.746	428.444	25.045	-	-	-	-	-	-	-	-
Senior debt drawdown				1.017.837	-	-	-	-	(16.995)	(5.633)	402.401	459.533	178.531	-	-	-	-	-	-
Loan interest and fees (excl. rolled up)				(2.680.590)	-	(0)	(0)	(0)	-	-	-	(28.420)	(28.420)	(95.774)	(95.003)	(94.202)	(93.367)	(92.499)	(91.596)
EIB repayment				(700.000)	-	-	-	-	-	-	-	-	-	(18.977)	(19.747)	(20.549)	(21.383)	(22.251)	(23.155)
Senior debt repayment				(87.857)	-	-	-	-	-	-	-	-	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Total Financing				(1.346.557)	-	(0)	(0)	(0)	218.780	534.752	545.447	556.356	209.714	(114.750)	(114.750)	(114.750)	(114.750)	(114.750)	(114.750)
Net cash flow after financing				**2.031.357**	**-**	**(0)**	**(0)**	**(0)**	**-**	**-**	**-**	**-**	**-**	**(48.696)**	**(39.997)**	**(30.977)**	**(27.088)**	**(22.951)**	**(18.655)**
Interest on Cash Balance				399.310	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Interest on Overdraft				(250.030)	-	-	-	-	-	-	-	-	(0)	(1.295)	(3.723)	(5.809)	(7.663)	(9.402)	(11.009)
Dividends				(644.402)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NET CASH FLOW			**FALSE**	**1.536.235**	**-**	**(0)**	**(0)**	**(0)**	**-**	**-**	**-**	**-**	**(0)**	**(49.991)**	**(43.721)**	**(36.786)**	**(34.751)**	**(32.353)**	**(29.664)**
Cash position begin period					-	-	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(49.991)	(93.712)	(130.498)	(165.249)	(197.602)
Net cash flow in period					-	(0)	(0)	(0)	-	-	-	-	(0)	(49.991)	(43.721)	(36.786)	(34.751)	(32.353)	(29.664)
Cash position end period			**TRUE**	-	-	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(49.991)	(93.712)	(130.498)	(165.249)	(197.602)	(227.266)

A 16.6 Uitkomsten Financieel model: ArupSum tracé: Refined

A 16.6.3 Niveau BAM entiteit

Calcs / Scenario Calculations																			
Verfijnd A/S-tracé Sensitivity: Case 1: Base																			
Calculate	INPUT	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
CASH FLOW STATEMENT																			
Operating Cash Flow																			
Revenues		228.217	235.457	242.929	250.640	258.597	266.809	275.283	284.029	293.054	302.368	311.979	321.899	332.136	342.701	353.604	364.856	376.469	388.453
Availability Payment		(123.105)	(125.567)	(128.078)	(130.640)	(133.252)	(135.917)	(138.636)	(141.408)	(144.237)	(147.121)	(150.064)	(153.065)	(156.126)	(159.249)	(162.434)	(165.683)	(168.996)	(172.376)
Non deductable VAT on Availability Payments	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operational Expenses		(4.879)	(5.032)	(5.190)	(5.354)	(5.522)	(5.695)	(5.874)	(6.059)	(6.250)	(6.447)	(6.650)	(6.859)	(7.075)	(7.298)	(7.528)	(7.765)	(8.010)	(8.263)
Debtor cashflow		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Creditor cashflow		201	205	209	213	218	222	227	231	236	240	245	250	255	260	265	271	276	282
VAT cashflow		123	127	131	135	139	144	148	153	158	163	168	174	179	185	191	197	203	210
Total Operating Cash Flow		100.557	105.190	110.001	114.995	120.180	125.562	131.148	136.945	142.961	149.203	155.680	162.399	169.369	176.599	184.098	191.876	199.942	208.305
Capital Expenditure																			
Construction payments		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non deductable VAT on Construction Payments	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tax		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net cash flow before financing		**100.557**	**105.190**	**110.001**	**114.995**	**120.180**	**125.562**	**131.148**	**136.945**	**142.961**	**149.203**	**155.680**	**162.399**	**169.369**	**176.599**	**184.098**	**191.876**	**199.942**	**208.305**
Financing																			
Equity injection		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equity repayment		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EIB drawdown		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senior debt drawdown		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loan interest and fees (excl. rolled up)		(90.656)	(89.677)	(88.659)	(87.600)	(86.498)	(85.351)	(84.157)	(82.915)	(81.623)	(80.278)	(78.878)	(77.422)	(75.906)	(74.329)	(72.688)	(70.980)	(68.950)	(62.249)
EIB repayment		(24.095)	(25.073)	(26.091)	(27.150)	(28.253)	(29.400)	(30.593)	(31.835)	(33.128)	(34.473)	(35.872)	(37.329)	(38.844)	(40.422)	(42.063)	(43.770)	(45.547)	-
Senior debt repayment		(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(4.349)	(83.508)	-
Total Financing		(114.750)	(114.750)	(114.750)	(114.750)	(114.750)	(114.750)	(114.750)	(114.750)	(114.750)	(114.750)	(114.750)	(114.750)	(114.750)	(114.750)	(114.750)	(119.099)	(198.006)	(62.249)
Net cash flow after financing		**(14.193)**	**(9.560)**	**(4.750)**	**245**	**5.430**	**10.812**	**16.397**	**22.195**	**28.210**	**34.453**	**40.929**	**47.648**	**54.618**	**61.849**	**69.348**	**72.777**	**1.936**	**146.056**
Interest on Cash Balance		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.788
Interest on Overdraft		(12.468)	(13.763)	(14.876)	(15.787)	(16.476)	(16.921)	(17.097)	(16.980)	(16.543)	(15.756)	(14.589)	(13.009)	(10.981)	(8.467)	(5.428)	(1.936)	(51)	-
Dividends		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NET CASH FLOW		**(26.661)**	**(23.323)**	**(19.626)**	**(15.542)**	**(11.047)**	**(6.109)**	**(700)**	**5.214**	**11.668**	**18.697**	**26.340**	**34.639**	**43.638**	**53.382**	**63.920**	**70.841**	**1.884**	**148.844**
Cash position begin period		(227.266)	(253.927)	(277.250)	(296.876)	(312.418)	(323.465)	(329.574)	(330.274)	(325.059)	(313.392)	(294.695)	(268.355)	(233.716)	(190.078)	(136.697)	(72.777)	(1.936)	(51)
Net cash flow in period		(26.661)	(23.323)	(19.626)	(15.542)	(11.047)	(6.109)	(700)	5.214	11.668	18.697	26.340	34.639	43.638	53.382	63.920	70.841	1.884	148.844
Cash position end period		(253.927)	(277.250)	(296.876)	(312.418)	(323.465)	(329.574)	(330.274)	(325.059)	(313.392)	(294.695)	(268.355)	(233.716)	(190.078)	(136.697)	(72.777)	(1.936)	(51)	148.792

Calcs / Scenario Calculations																		
Verfijnd A/S-tracé Sensitivity: Case 1: Base																		
Calculate	INPUT	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
		34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
CASH FLOW STATEMENT																		
Operating Cash Flow																		
Revenues		400.822	413.587	426.760	440.357	454.388	468.870	483.816	499.242	515.162	531.593	-	-	-	-	-	-	-
Availability Payment		(175.824)	(179.340)	(182.927)	(186.585)	(190.317)	(194.124)	(198.006)	(201.966)	(206.005)	(210.126)	-	-	-	-	-	-	-
Non deductable VAT on Availability Payments	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operational Expenses		(8.524)	(8.793)	(9.070)	(9.357)	(9.653)	(9.958)	(10.272)	(10.597)	(10.932)	(11.278)	-	-	-	-	-	-	-
Debtor cashflow		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Creditor cashflow		287	293	299	305	311	317	324	330	337	343	(17.510)	-	-	-	-	-	-
VAT cashflow		216	223	231	238	246	253	262	270	279	288	(9.303)	-	-	-	-	-	-
Total Operating Cash Flow		216.978	225.970	235.292	244.957	254.975	265.360	276.123	287.278	298.839	310.820	(26.813)	-	-	-	-	-	-
Capital Expenditure																		
Construction payments		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non deductable VAT on Construction Payments	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Capital Expenditure		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tax		-	-	-	-	-	-	(21.279)	(70.414)	(75.393)	(164.879)	-	-	-	-	-	-	-
Net cash flow before financing		**216.978**	**225.970**	**235.292**	**244.957**	**254.975**	**265.360**	**254.844**	**216.864**	**223.446**	**145.941**	**(26.813)**	**-**	**-**	**-**	**-**	**-**	**-**
Financing																		
Equity injection		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Equity repayment		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EIB drawdown		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senior debt drawdown		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loan interest and fees (excl. rolled up)		(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	-	-	-	-	-	-	-
EIB repayment		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senior debt repayment		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Financing		(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	-	-	-	-	-	-	-
Net cash flow after financing		**154.729**	**163.721**	**173.043**	**182.708**	**192.726**	**203.110**	**192.595**	**154.615**	**161.197**	**83.692**	**(26.813)**	**-**	**-**	**-**	**-**	**-**	**-**
Interest on Cash Balance		8.639	15.052	22.059	29.696	38.001	47.014	54.790	58.293	60.961	62.018	-	-	-	-	-	-	-
Interest on Overdraft		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dividends		-	-	-	-	-	(41.306)	(136.686)	(146.351)	(155.732)	(164.327)	-	-	-	-	-	-	-
NET CASH FLOW		**163.368**	**178.772**	**195.102**	**212.404**	**230.727**	**208.818**	**110.698**	**66.557**	**66.426**	**(18.617)**	**(26.813)**	**-**	**-**	**-**	**-**	**-**	**-**
Cash position begin period		148.792	312.160	490.933	686.035	898.439	1.129.166	1.337.984	1.448.682	1.515.239	1.581.665	1.563.048	1.536.235	1.536.235	1.536.235	1.536.235	1.536.235	1.536.235
Net cash flow in period		163.368	178.772	195.102	212.404	230.727	208.818	110.698	66.557	66.426	(18.617)	(26.813)	-	-	-	-	-	-
Cash position end period		312.160	490.933	686.035	898.439	1.129.166	1.337.984	1.448.682	1.515.239	1.581.665	1.563.048	1.536.235	1.536.235	1.536.235	1.536.235	1.536.235	1.536.235	1.536.235

A 16.6 Uitkomsten Financieel model: ArupSum tracé: Refined

A 16.6.3 Niveau BAM entiteit

Calcs / Scenario Calculations																			
Verfijnd A/S-tracé Sensitivity: Case 1: Base																			
Calculate	INPUT		Check	TOTAL	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
			FALSE		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PROFIT AND LOSS STATEMENT																			
Revenues				11.445.686	-	-	-	-	-	-	-	-	168.037	178.801	189.928	201.428	207.813	214.402	221.201
Availability Payment				(5.357.905)	-	-	-	-	-	-	-	-	(107.170)	(109.313)	(111.500)	(113.730)	(116.004)	(118.324)	(120.691)
Operational Expenses				(243.670)	-	-	-	-	-	-	-	-	(3.556)	(3.800)	(4.052)	(4.312)	(4.447)	(4.587)	(4.731)
Depreciation of construction payments				(2.134.232)	-	-	-	-	-	-	-	-	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)
EBIT				3.709.879	-	-	-	-	-	-	-	-	(3.667)	4.710	13.398	22.408	26.383	30.512	34.801
Interest and fees on financing				(2.882.791)	-	(0)	(0)	(0)	(31.366)	(24.954)	(44.559)	(69.862)	(88.300)	(95.774)	(95.003)	(94.202)	(93.367)	(92.499)	(91.596)
Interest on Cash Balance / Overdraft				149.280	-	-	-	-	-	-	-	-	(0)	(1.295)	(3.723)	(5.809)	(7.663)	(9.402)	(11.009)
Result before taxes				976.367	-	(0)	(0)	(0)	(31.366)	(24.954)	(44.559)	(69.862)	(91.968)	(92.360)	(85.328)	(77.603)	(74.647)	(71.388)	(67.803)
Tax				(331.965)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Profit after tax					-	(0)	(0)	(0)	(31.366)	(24.954)	(44.559)	(69.862)	(91.968)	(92.360)	(85.328)	(77.603)	(74.647)	(71.388)	(67.803)
Dividends				(644.402)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NET Result				-	-	(0)	(0)	(0)	(31.366)	(24.954)	(44.559)	(69.862)	(91.968)	(92.360)	(85.328)	(77.603)	(74.647)	(71.388)	(67.803)
Unrepaid equity				464.818															
Check ending profit balance			FALSE	(1.536.235)															
BALANCE SHEET Extract																			
Fixed Assets																			
Construction payments					0	0	0	0	218.780	753.533	1.298.980	1.855.336	2.073.254	2.012.276	1.951.298	1.890.320	1.829.342	1.768.364	1.707.386
					0	0	0	0	218.780	753.533	1.298.980	1.855.336	2.073.254	2.012.276	1.951.298	1.890.320	1.829.342	1.768.364	1.707.386
Debtors					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cash Balance					0	0	0	0	0	0	0	0	0	-49.991	-93.712	-130.498	-165.249	-197.602	-227.266
TOTAL ASSETS					**0**	**0**	**0**	**0**	**218.780**	**753.533**	**1.298.980**	**1.855.336**	**2.073.254**	**1.962.285**	**1.857.586**	**1.759.822**	**1.664.093**	**1.570.762**	**1.480.120**
Equity					-	-	-	-	50.029	161.971	279.972	405.215	464.818	464.818	464.818	464.818	464.818	464.818	464.818
P&L Reserves					0	0	0	0	-31.366	-56.320	-100.879	-170.741	-262.709	-355.068	-440.397	-517.999	-592.646	-664.035	-731.838
EIB loan					-	-	-	-	200.117	647.882	700.000	700.000	700.000	681.023	661.276	640.727	619.344	597.093	573.938
Senior loan					0	0	0	0	0	0	419.887	920.862	1.159.273	1.159.273	1.159.273	1.159.273	1.159.273	1.159.273	1.159.273
Creditor					-	-	-	-	-	-	-	-	8.931	9.109	9.292	9.477	9.667	9.860	10.058
VAT Creditor					-	-	-	-	-	-	-	-	2.941	3.129	3.324	3.525	3.637	3.752	3.871
Tax creditor					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL LIABILITIES					**0**	**0**	**0**	**0**	**218.780**	**753.533**	**1.298.980**	**1.855.336**	**2.073.254**	**1.962.285**	**1.857.586**	**1.759.822**	**1.664.093**	**1.570.762**	**1.480.120**
			TRUE		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Calcs / Scenario Calculations																			
Verfijnd A/S-tracé Sensitivity: Case 1: Base																			
Calculate	INPUT	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
PROFIT AND LOSS STATEMENT																			
Revenues		228.217	235.457	242.929	250.640	258.597	266.809	275.283	284.029	293.054	302.368	311.979	321.899	332.136	342.701	353.604	364.856	376.469	388.453
Availability Payment		(123.105)	(125.567)	(128.078)	(130.640)	(133.252)	(135.917)	(138.636)	(141.408)	(144.237)	(147.121)	(150.064)	(153.065)	(156.126)	(159.249)	(162.434)	(165.683)	(168.996)	(172.376)
Operational Expenses		(4.879)	(5.032)	(5.190)	(5.354)	(5.522)	(5.695)	(5.874)	(6.059)	(6.250)	(6.447)	(6.650)	(6.859)	(7.075)	(7.298)	(7.528)	(7.765)	(8.010)	(8.263)
Depreciation of construction payments		(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)
EBIT		**39.255**	**43.880**	**48.683**	**53.669**	**58.845**	**64.218**	**69.795**	**75.583**	**81.589**	**87.822**	**94.288**	**100.997**	**107.957**	**115.176**	**122.664**	**130.430**	**138.484**	**146.836**
Interest and fees on financing		(90.656)	(89.677)	(88.659)	(87.600)	(86.498)	(85.351)	(84.157)	(82.915)	(81.623)	(80.278)	(78.878)	(77.422)	(75.906)	(74.329)	(72.688)	(70.980)	(68.950)	(62.249)
Interest on Cash Balance / Overdraft		(12.468)	(13.763)	(14.876)	(15.787)	(16.476)	(16.921)	(17.097)	(16.980)	(16.543)	(15.756)	(14.589)	(13.009)	(10.981)	(8.467)	(5.428)	(1.936)	(51)	2.788
Result before taxes		**(63.869)**	**(59.560)**	**(54.853)**	**(49.719)**	**(44.129)**	**(38.053)**	**(31.459)**	**(24.312)**	**(16.576)**	**(8.212)**	**821**	**10.566**	**21.070**	**32.380**	**44.548**	**57.514**	**69.482**	**87.374**
Tax		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Profit after tax		(63.869)	(59.560)	(54.853)	(49.719)	(44.129)	(38.053)	(31.459)	(24.312)	(16.576)	(8.212)	821	10.566	21.070	32.380	44.548	57.514	69.482	87.374
Dividends		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NET Result		**(63.869)**	**(59.560)**	**(54.853)**	**(49.719)**	**(44.129)**	**(38.053)**	**(31.459)**	**(24.312)**	**(16.576)**	**(8.212)**	**821**	**10.566**	**21.070**	**32.380**	**44.548**	**57.514**	**69.482**	**87.374**
Unrepaid equity																			
Check ending profit balance																			
BALANCE SHEET Extract																			
Fixed Assets																			
Construction payments		1.646.408	1.585.430	1.524.451	1.463.473	1.402.495	1.341.517	1.280.539	1.219.561	1.158.583	1.097.605	1.036.627	975.649	914.671	853.693	792.715	731.737	670.759	609.781
		1.646.408	1.585.430	1.524.451	1.463.473	1.402.495	1.341.517	1.280.539	1.219.561	1.158.583	1.097.605	1.036.627	975.649	914.671	853.693	792.715	731.737	670.759	609.781
Debtors		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cash Balance		-253.927	-277.250	-296.876	-312.418	-323.465	-329.574	-330.274	-325.059	-313.392	-294.695	-268.355	-233.716	-190.078	-136.697	-72.777	-1.936	-51	148.792
TOTAL ASSETS		**1.392.481**	**1.308.179**	**1.227.575**	**1.151.055**	**1.079.030**	**1.011.943**	**950.265**	**894.502**	**845.191**	**802.910**	**768.272**	**741.933**	**724.592**	**716.996**	**719.938**	**729.801**	**670.707**	**758.573**
Equity		464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818
P&L Reserves		-795.707	-855.267	-910.120	-959.839	-1.003.968	-1.042.021	-1.073.480	-1.097.793	-1.114.369	-1.122.581	-1.121.760	-1.111.194	-1.090.124	-1.057.744	-1.013.195	-955.681	-886.199	-798.824
EIB loan		549.843	524.770	498.679	471.529	443.277	413.877	383.284	351.448	318.321	283.848	247.975	210.646	171.802	131.380	89.318	45.547	-	-
Senior loan		1.159.273	1.159.273	1.159.273	1.159.273	1.159.273	1.159.273	1.159.273	1.159.273	1.159.273	1.159.273	1.159.273	1.159.273	1.159.273	1.159.273	1.159.273	1.154.924	1.071.417	1.071.417
Creditor		10.259	10.464	10.673	10.887	11.104	11.326	11.553	11.784	12.020	12.260	12.505	12.755	13.011	13.271	13.536	13.807	14.083	14.365
VAT Creditor		3.994	4.121	4.251	4.386	4.525	4.669	4.817	4.971	5.128	5.291	5.460	5.633	5.812	5.997	6.188	6.385	6.588	6.798
Tax creditor		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL LIABILITIES		**1.392.481**	**1.308.179**	**1.227.575**	**1.151.055**	**1.079.030**	**1.011.943**	**950.265**	**894.502**	**845.191**	**802.910**	**768.272**	**741.933**	**724.592**	**716.996**	**719.938**	**729.801**	**670.707**	**758.573**
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

A 16.6 Uitkomsten Financieel model: ArupSum tracé: Refined

A 16.6.3 Niveau BAM entiteit

Calcs / Scenario Calculations																		
Verfijnd A/S-tracé Sensitivity: Case 1: Base																		
Calculate	INPUT	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
		34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
PROFIT AND LOSS STATEMENT																		
Revenues		400.822	413.587	426.760	440.357	454.388	468.870	483.816	499.242	515.162	531.593	-	-	-	-	-	-	-
Availability Payment		(175.824)	(179.340)	(182.927)	(186.585)	(190.317)	(194.124)	(198.006)	(201.966)	(206.005)	(210.126)	-	-	-	-	-	-	-
Operational Expenses		(8.524)	(8.793)	(9.070)	(9.357)	(9.653)	(9.958)	(10.272)	(10.597)	(10.932)	(11.278)	-	-	-	-	-	-	-
Depreciation of construction payments		(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	(60.978)	-	-	-	-	-	-	-
EBIT		**155.496**	**164.476**	**173.785**	**183.436**	**193.441**	**203.811**	**214.560**	**225.700**	**237.246**	**249.211**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Interest and fees on financing		(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	(62.249)	-	-	-	-	-	-	-
Interest on Cash Balance / Overdraft		8.639	15.052	22.059	29.696	38.001	47.014	54.790	58.293	60.961	62.018	-	-	-	-	-	-	-
Result before taxes		**101.886**	**117.278**	**133.594**	**150.883**	**169.193**	**188.575**	**207.100**	**221.744**	**235.958**	**248.980**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Tax		-	-	-	-	-	(21.279)	(70.414)	(75.393)	(80.226)	(84.653)	-	-	-	-	-	-	-
Profit after tax		101.886	117.278	133.594	150.883	169.193	167.296	136.686	146.351	155.732	164.327	-	-	-	-	-	-	-
Dividends		-	-	-	-	-	(41.306)	(136.686)	(146.351)	(155.732)	(164.327)	-	-	-	-	-	-	-
NET Result		**101.886**	**117.278**	**133.594**	**150.883**	**169.193**	**125.990**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Unrepaid equity																		
Check ending profit balance																		
BALANCE SHEET Extract																		
Fixed Assets																		
Construction payments		548.803	487.824	426.846	365.868	304.890	243.912	182.934	121.956	60.978	0	0	0	0	0	0	0	0
		548.803	487.824	426.846	365.868	304.890	243.912	182.934	121.956	60.978	0	0	0	0	0	0	0	0
Debtors		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cash Balance		312.160	490.933	686.035	898.439	1.129.166	1.337.984	1.448.682	1.515.239	1.581.665	1.563.048	1.536.235	1.536.235	1.536.235	1.536.235	1.536.235	1.536.235	1.536.235
TOTAL ASSETS		**860.963**	**978.757**	**1.112.881**	**1.264.307**	**1.434.056**	**1.581.896**	**1.631.616**	**1.637.195**	**1.642.643**	**1.563.048**	**1.536.235**	**1.536.235**	**1.536.235**	**1.536.235**	**1.536.235**	**1.536.235**	**1.536.235**
Equity		464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818	464.818
P&L Reserves		-696.938	-579.660	-446.066	-295.183	-125.990	0	0	0	0	0	0	0	0	0	0	0	0
EIB loan		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Senior loan		1.071.417	1.071.417	1.071.417	1.071.417	1.071.417	1.071.417	1.071.417	1.071.417	1.071.417	1.071.417	1.071.417	1.071.417	1.071.417	1.071.417	1.071.417	1.071.417	1.071.417
Creditor		14.652	14.945	15.244	15.549	15.860	16.177	16.500	16.831	17.167	17.510	-	-	-	-	-	-	-
VAT Creditor		7.014	7.238	7.468	7.706	7.952	8.205	8.467	8.737	9.015	9.303	-	-	-	-	-	-	-
Tax creditor		0	0	0	0	0	21.279	70.414	75.393	80.226	0	0	0	0	0	0	0	0
TOTAL LIABILITIES		**860.963**	**978.757**	**1.112.881**	**1.264.307**	**1.434.056**	**1.581.896**	**1.631.616**	**1.637.195**	**1.642.643**	**1.563.048**	**1.536.235**	**1.536.235**	**1.536.235**	**1.536.235**	**1.536.235**	**1.536.235**	**1.536.235**
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

A16.6.4 Samenvatting

Oosterweel — **In million EURO**

ARUP-SUM
Verfijnd A/S-tracé
Sensitivity: Case 1: Base
2/07/2009

Calculate all scenarios | Calculate all sensitivites

Operational

Check	SVPCalcs TRUE	BAMCalcs FALSE	ProjectCalcs FALSE	OpCalcs TRUE
End cash	0,0	1.536,2	1.536,2	
End retained profits	-	-	0,0	
Minimum cash	-	(330,3)	(277,1)	
Minimum retained profits	(0,0)	(1.122,6)	(1.122,6)	

Availability payment

Annual payment - unindexed	91,5

Finance

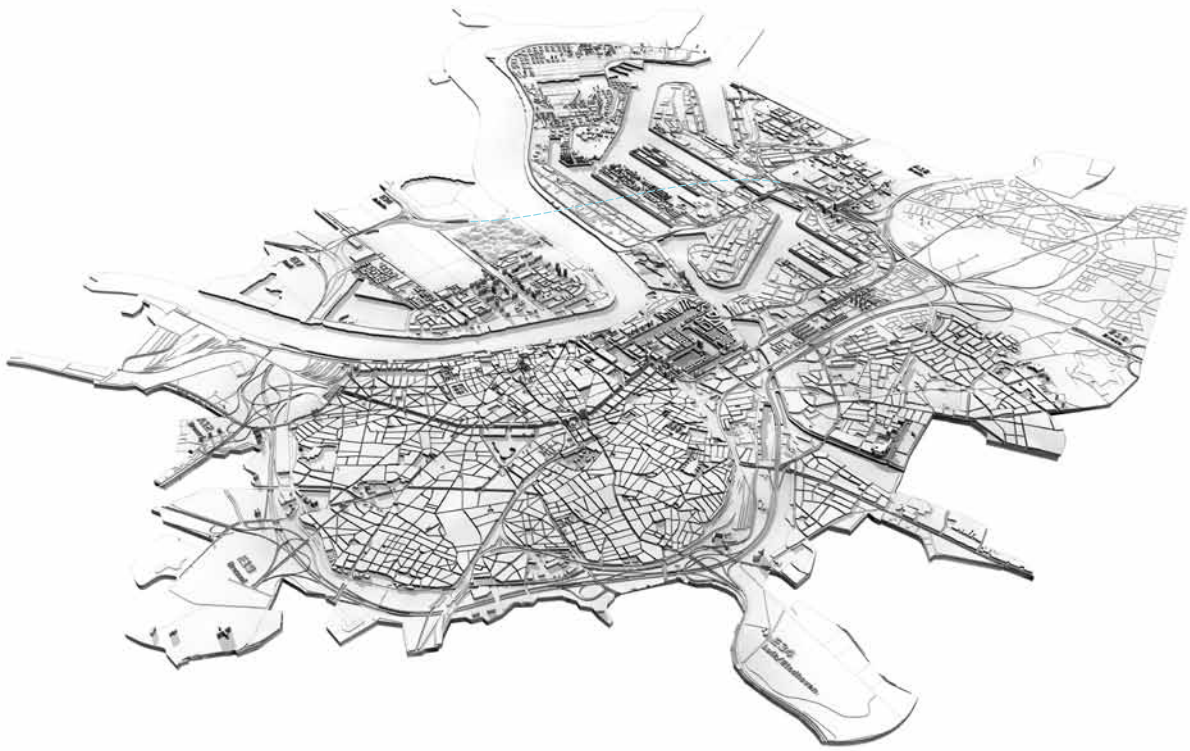
	SPV Bank Loan	BAM Bank Loan	EIB Loan (BAM)
Facility	420,3	1.159,3	700,0
Gearing	70%	50%	30%
Interest rate	5,81%	5,81%	4,06%
Arrangement fee	1,00%	1,00%	1,00%
Commitment fee	0,50%	0,50%	0,50%
Upfront costs	0,1	0,1	0,1
Loan term (years)	28	28	28
Repayment term (years)	23	23	23
Repayment type	Annuity	As soon as possible	Annuity
Repaid?	TRUE	FALSE	TRUE
Last repayment date	2040	2040	2040
Remaining balance	-	1.071,4	-
Min ADSCR	2,249	0,981	
Target ADSCR	1,150	1,150	
Passed?	TRUE	FALSE	
Min LLCR	3,366	-	
Target LLCR	1,200	1,200	
Passed?	TRUE	FALSE	

Returns

	Project
Revenues (indexed)	11.445,7
Operating Costs (indexed)	(1.890,8)
Operating cash flow (indexed)	9.554,8
Capital expenditure (indexed)	(2.732,5)

	SPV	BAM	Project after tax	Project before tax
IRR	15,00%	#DIV/0!	6,07%	6,79%
NPV at 6,08%	263,8	(250,9)	(3,3)	204,0
NPV of dividends	368,1	56,1		
Investment	180,1	464,8		
Dividends	1.843,5	644,4		

Last cell



Colofon
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