

Environmental Impact Assessment

October 2020

India: Bengaluru Metro Rail Project

Phase 2A (Outer Road Ring Metro Line)

Volume 9
Annex 5

NOTES

- (i) The fiscal year (FY) of the Government of India and its agencies ends on 31 March. "FY" before a calendar year denotes the year in which the fiscal year ends, e.g., FY2019 ends on 31 March 2019.
- (ii) In this report, "\$" refers to United States dollars.

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KR Puram to Kempegowda International Airport

Operational Noise
Buildings from Street Map and Google Earth.
Noise noise power levels taken from DMO Scoping and I.L. Library and
Public Hearing Block locations. Train schedule and
South from feasibility study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**

Calculation in 1.5 m above ground

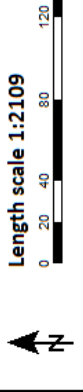
Project engineer: CMR
Created: 30/03/2024
Processed with SoundPLAN 11.1, Update: 16/07/2024

Levels Leq,d
in dB(A)

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	>= 65

Signs and symbols

Red circle	Construction Equip
Blue hatched rectangle	Main building
Yellow star	Point receiver
Black line with red diamond	+3dB(A) increase from
Red diamond	Point Sources
Pink line	Line source
Green line	Geometry bitmap
Green line	Wall
Green line	Wall
Green line	Elevation point
White rectangle	Bodeneffekte
White rectangle	Rechnergestützte Area



KR Puram to Kempgowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from EMU Soundplan 8.1 Library and BMRC Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

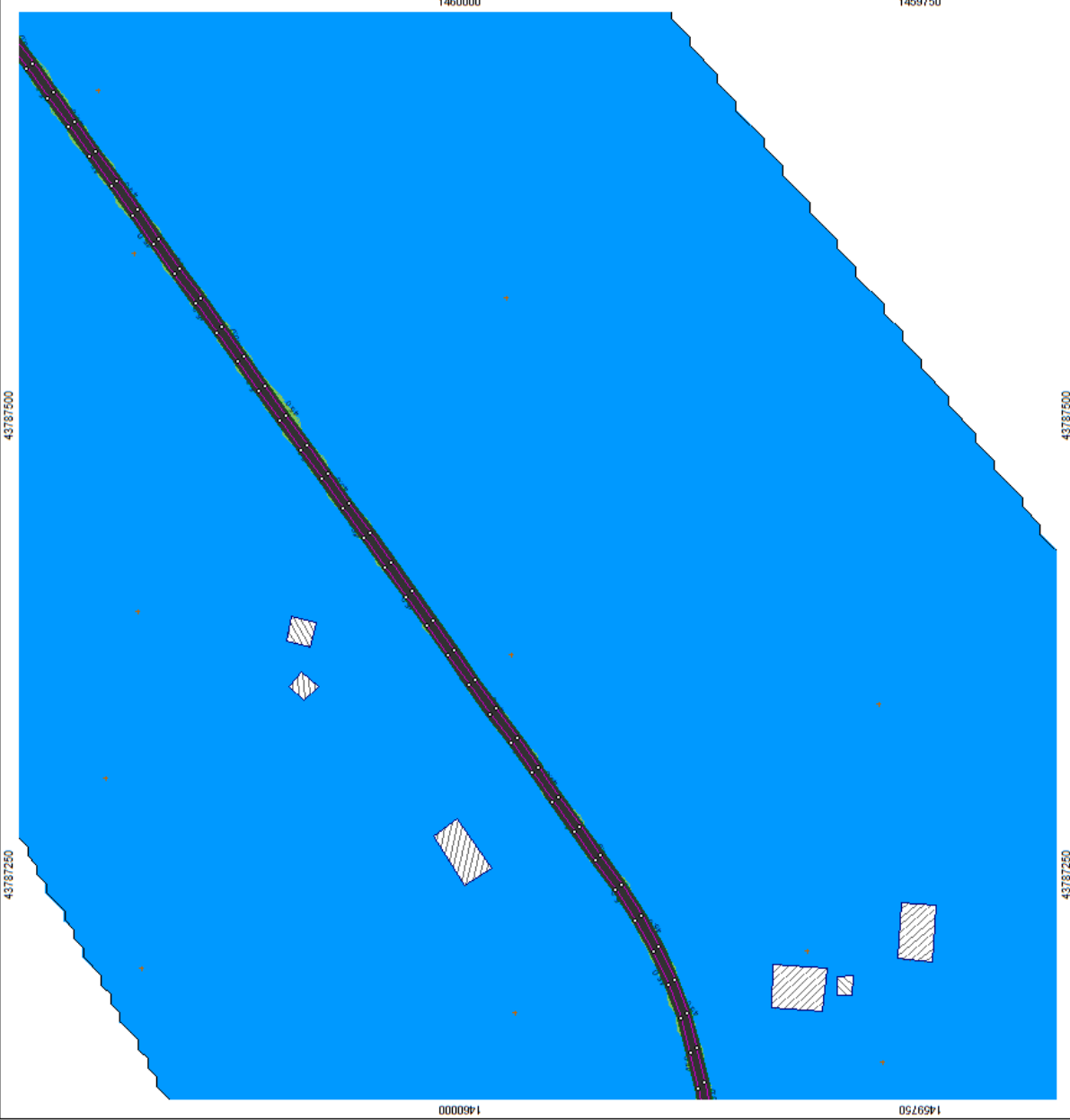
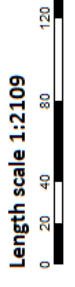
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1. Update: 10/23/2018

Levels Leq,n in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Construction Equip
Main building
Point receiver
-3dB(A) increase from
Point Sources
Line source
Geometry bitmap
Wall
Elevation point
Bodeneffekte
Noise calculation area



KR Puram to Kempegowda International Airport

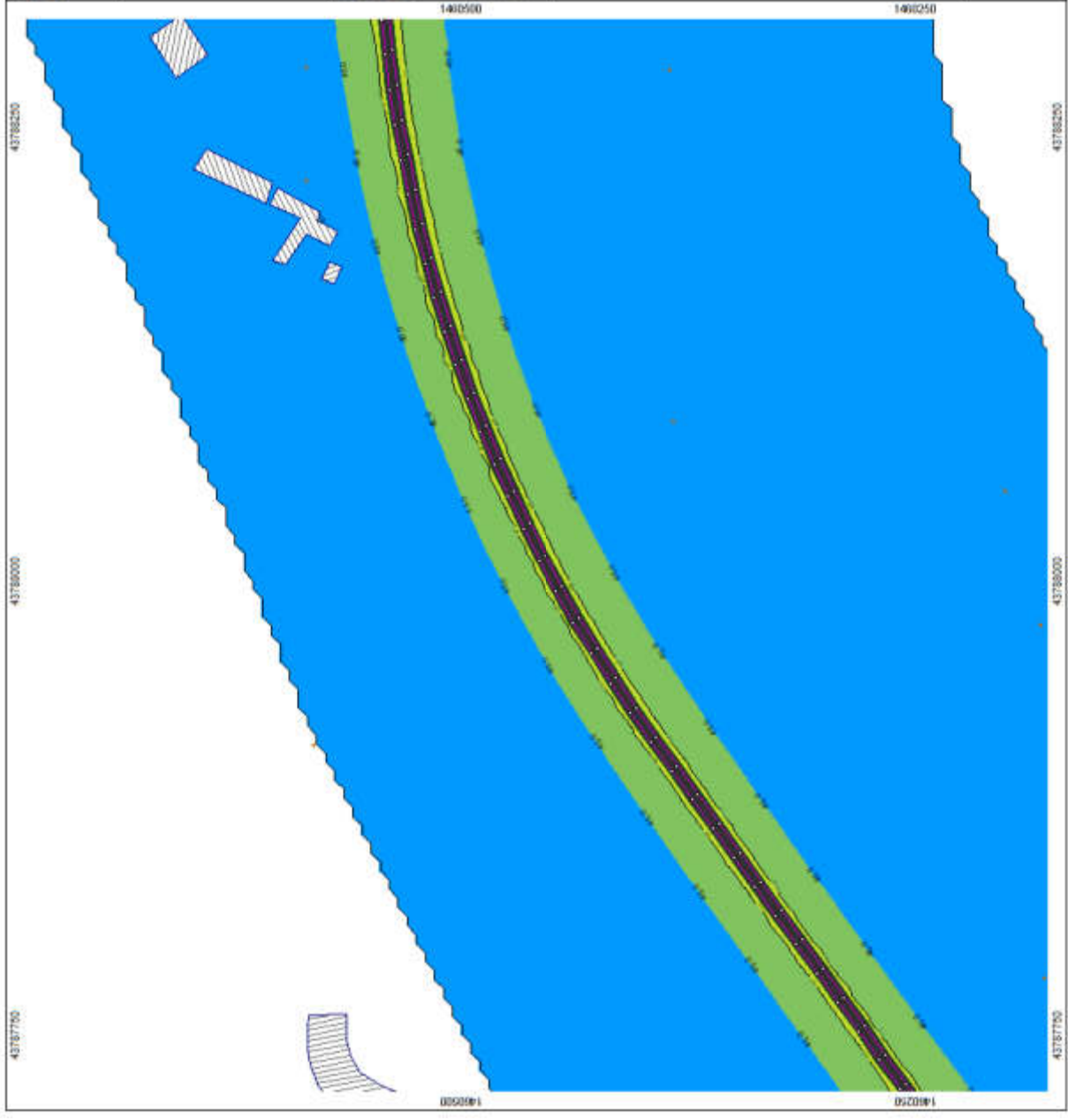
Operational Noise:
 Buildings from Street Map and Google Earth.
 Data from the Noise Model (MIL) developed by B.L. Library and
 MARS, Ministry of Road Transport and Highways, Transport
 Research Institute, New Delhi.

**120 2024 2B with Parapet Wall
 Noise Contour Map
 Leq,d**

Calculation in 1.5 m above ground

Project engineer: OMK
 Drawn: 10/10/2024
 Processor with AutoCAD: K.L. Update: 10/21/2024

- Levels Leq,d in dB(A)**
- < 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - >= 65
- Signs and symbols**
- Construction layout
 - Main building
 - Point receiver
 - 32dB(A) increase line
 - Point Source
 - Line source
 - Geometry shape
 - Wall
 - Elevation point
 - Receptor
 - Maximum elevation area



KR Puram to Kempegowda International Airport

Operational Noise.
Buildings from Street Map and Google Earth.
Train noise power levels taken from EMU Soundplan 8.1 Library and
BMRCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n
Calculation in 1.5 m above ground

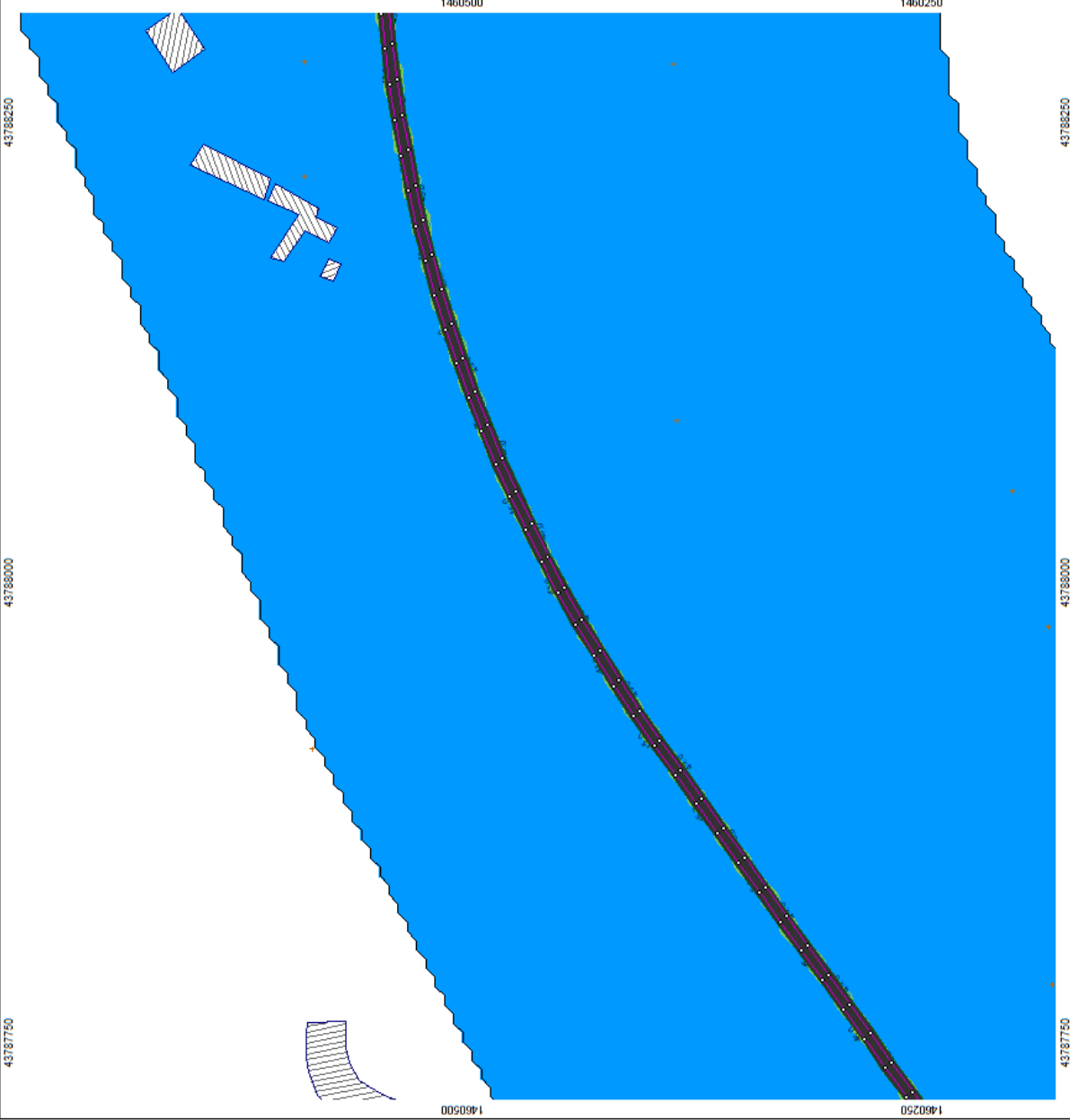
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1. Update: 10/23/2018

Levels Leq,n in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall	Construction Equip
Main building	Point receiver
-3dB(A) increase from	Point Sources
Line source	Geometry blinmap
Wall	Wall
Elevation point	Bodeneffekte
Mixturkalkulations area	



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Main building from GIS data.
BMRCL Rolling Stock Specification, Train schedule and speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Proceeded with SoundPLAN 8.1, Update: 10/23/2018



KR Puram to Kempgowda International Airport

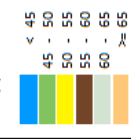
Operational Noise:
Buildings from Street Map and Google Earth.
Elevation points from BDU Soundplan 8.1. Library and
BANC. Receiving Sites from Soundplan 8.1. Calculation:
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map**

Leq,n
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with soundPLAN 8.1, Update 10/23/2018

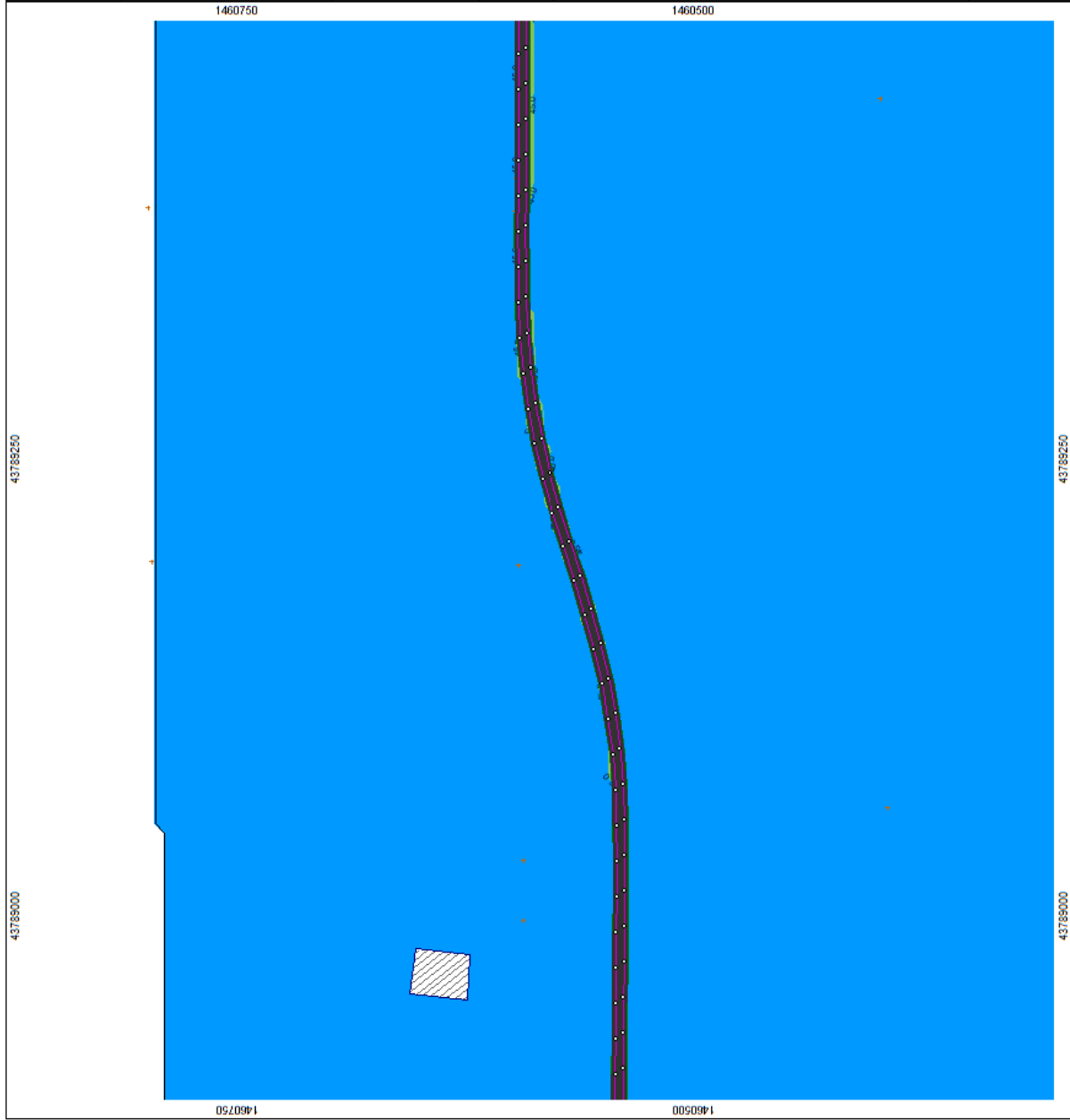
**Levels Leq,n
in dB(A)**



Signs and symbols

- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bottomeflate
- Noise calculation area

Length scale 1:2109



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
The map is based on the current EMU Soundplan 8.1 Library and
BMBCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

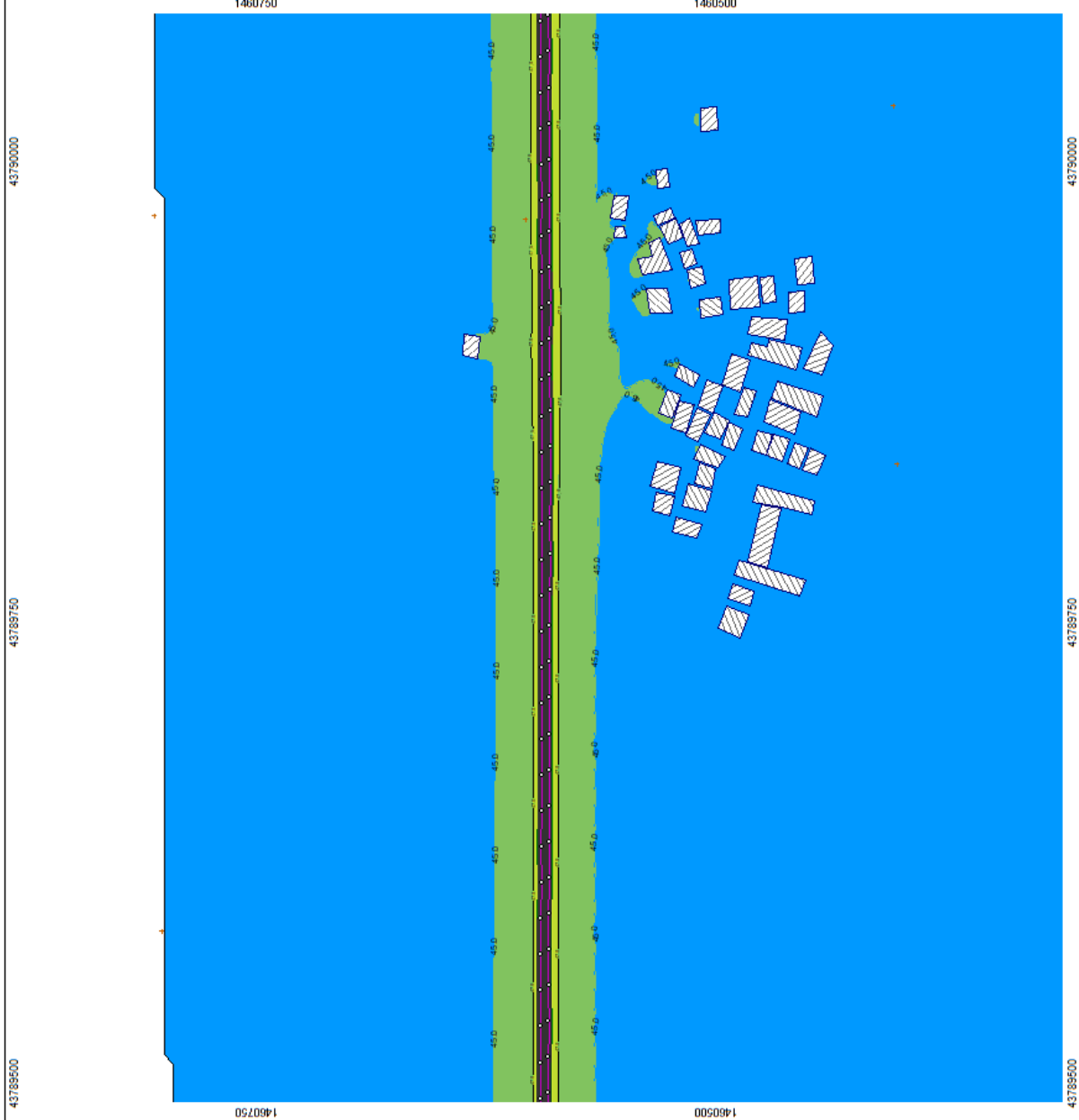
Project engineer: CMR
Created by: JOD/DO
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,d in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- ≥ 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry blimap
- Wall
- Wall
- Elevation point
- Bodeneffekte
- Rechner-Validations area



KR Puram to Kempegowda International Airport

Operational Noise.
Buildings from Street Map and Google Earth.
Train noise power levels taken from DMU Soundplan 8.1 Library and BMRCL Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

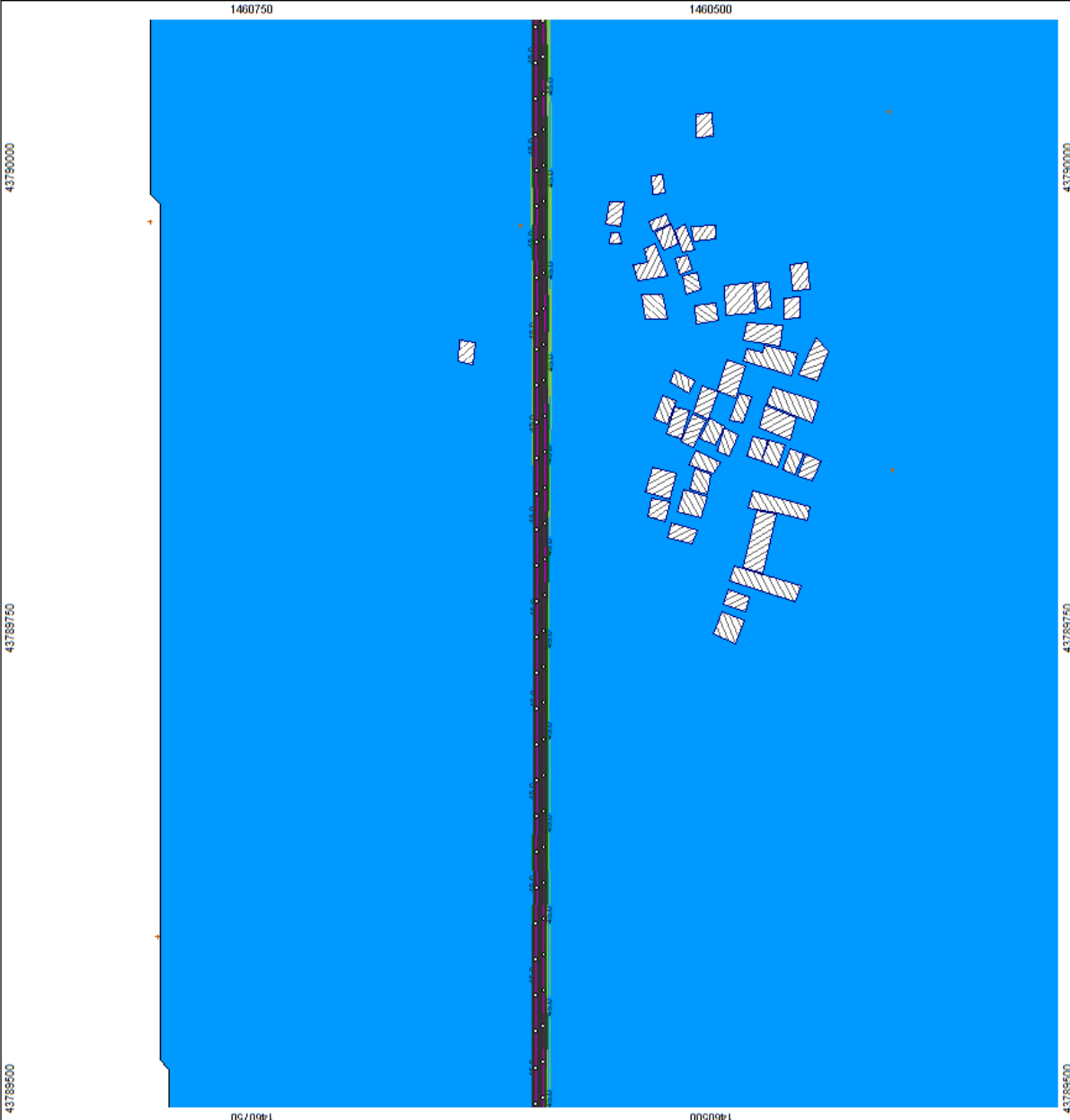
Levels Leq,n
In dB(A)



Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodeneffekte
- Noise calculation area

Length scale 1:2109
0 20 40 80 120 1

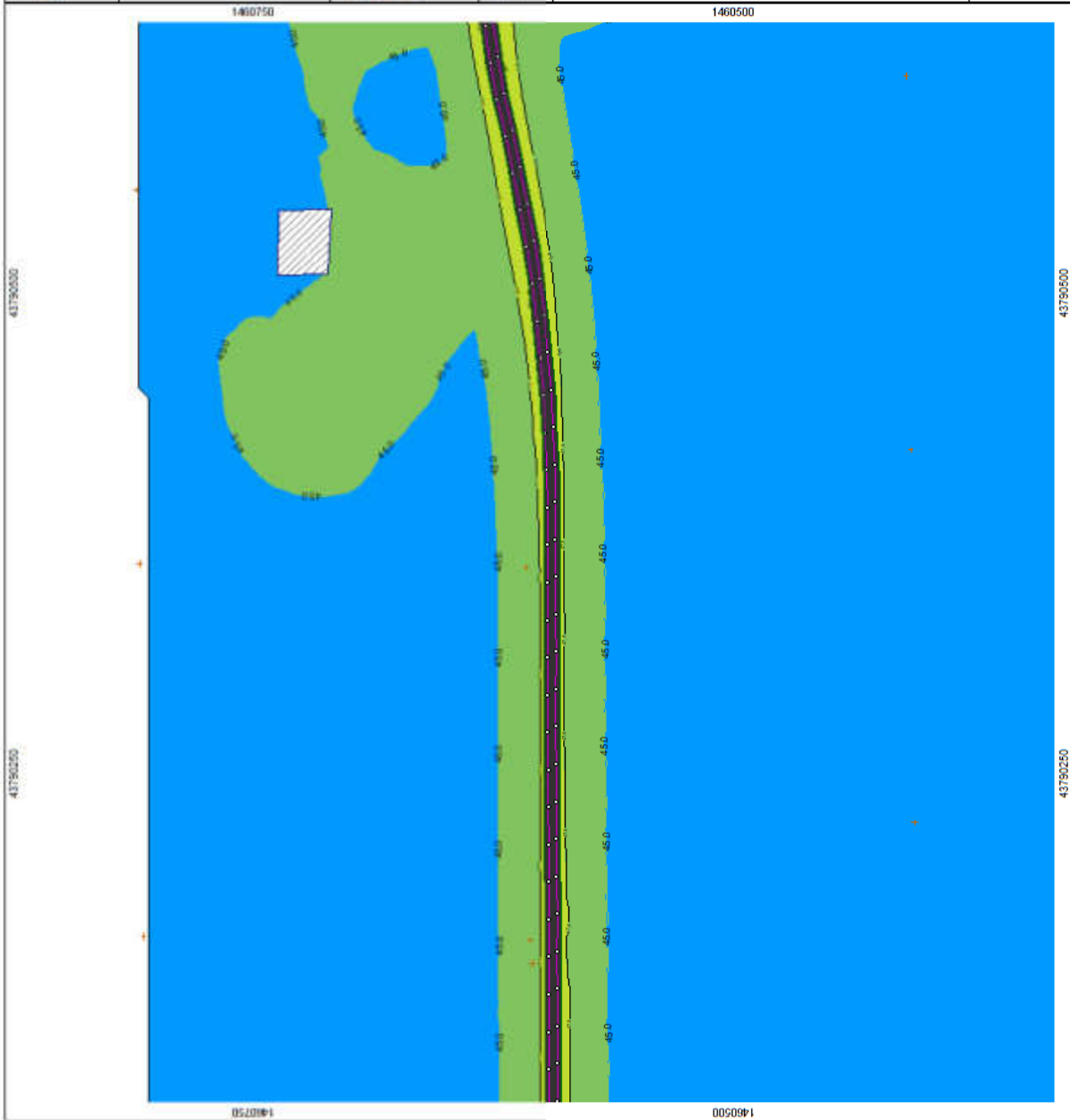


KR Puram to Kempegowda International Airport

Operational Noise:
 Building from Street Map and Google Earth.
 The noise contours are based on the ICAO Standard B.L. Library and
 (MRO) Building Stock Specification. Train Available and
 Speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
 Noise Contour Map
 Leq,d**
 Calculation in 1.5 m above ground

Project Engineer: OMR
 Created: 14/03/2024
 Produced with SoundPLAN 8.1. Update: 15/03/2024

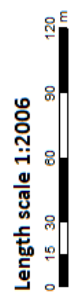


**Levels Leq,d
 in dB(A)**



Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Wall
- Elevation point
- Bodeneffekte
- Receiver calculation area



43790500

43790250

KR Puram to Kempegowda International Airport

Operational Noise.
Buildings from Street Map and Google Earth.
Train noise power levels taken from BMU Soundplan 8.1 Library and
BWRCC Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2024 2B with Parapet Wall
Noise Contour Map**

Leq,n
Calculation in 1.5 m above ground

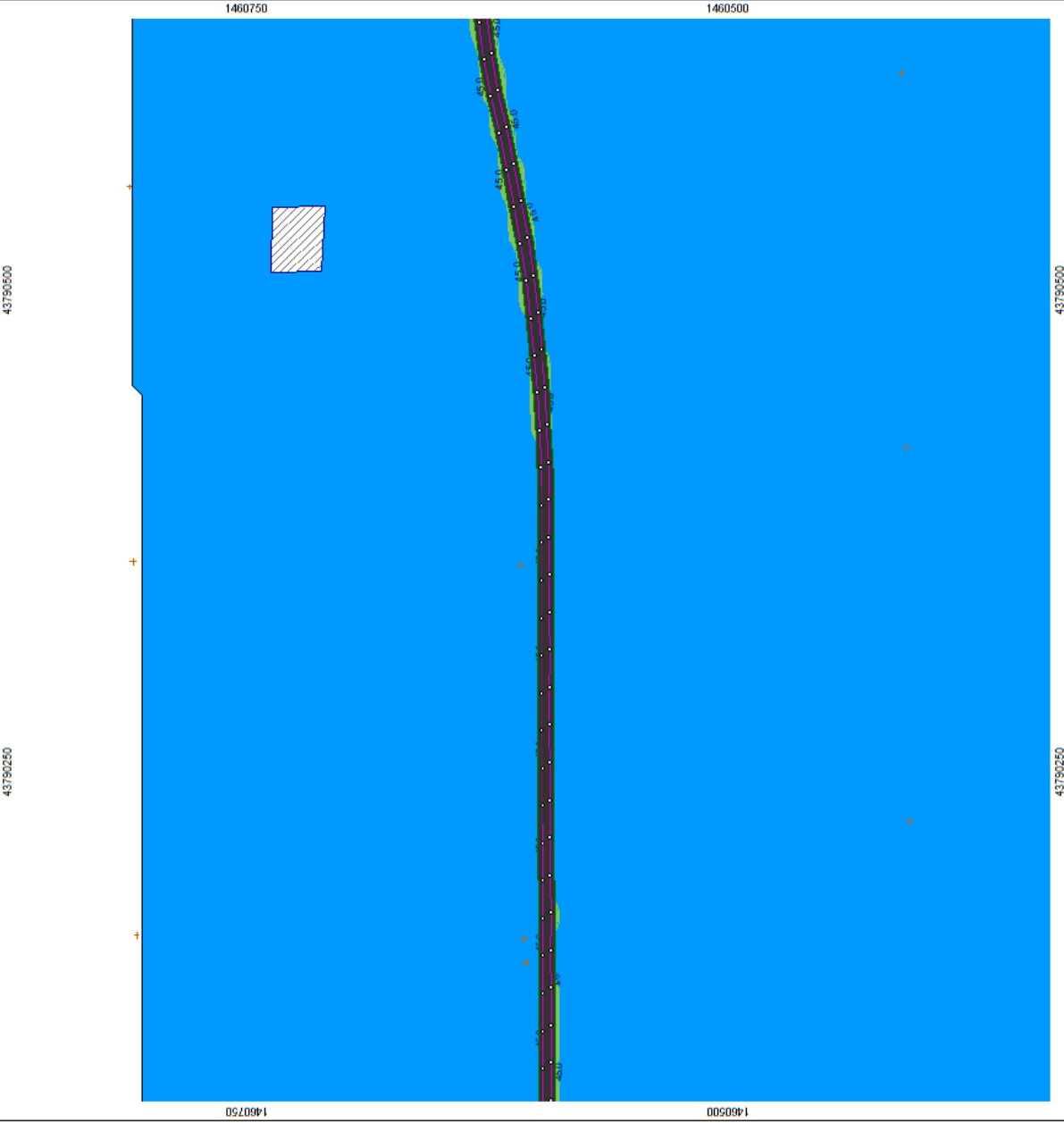
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n
in dB(A)

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	>= 65

Signs and symbols

Red dot	Construction Equip
Blue hatched box	Main building
Yellow star	Point receiver
Black line	+3dB(A) increase from
Red diamond	Point Sources
Purple line	Line source
Green hatched box	Geometry bitmap
Green line	Wall
Red line	Wall
Red cross	Elevation point
White box	Bodemeffekte
White box	Notberahtalshin areas



KR Puram to Kempegowda International Airport

Operational Noise Mapping from the Map and Grade-Path. Train noise levels taken from EMU Soundplan 8.1 Library and BMRC Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

120 2031.2b with Parapet Wall Noise Contour Map

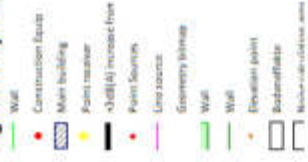
Leq,d
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/11/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,d
in dB(A)



Signs and symbols



Length scale 1:2887



KR Puram to Kemppegowda International Airport

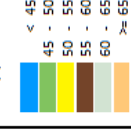
Operational Noise:
 from Street Map and Google Earth.
 The noise levels taken from EMU Soundplan 8.1 Library and
 BIMBCL Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
 Noise Contour Map**

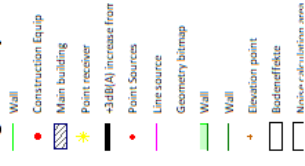
Leq,n
 Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 10/02/20
 Produced with SoundPLAN 8.1, Update 10/23/2018

**Levels Leq,n
 in dB(A)**



Signs and symbols



Length scale 1:2887



KR Puram to Kemppegowda International Airport

Operational Noise Building from Street Map and Google Earth. Train noise power levels taken from BMU Soundplan 8.1 Library and BMIRCL Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

120 2031.2b with Parapet Wall Noise Contour Map

Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 9/10/2018
 Processed with SoundPLAN 8.1, Update 10/03/2018

Levels Leq,d
 in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

●	Wall
●	Construction Equip
■	Main building
★	Point receiver
—	+3dB(A) increase from
●	Point Sources
—	Line source
—	Geometry blimp
—	Wall
+	Elevation point
□	Bodenreflekt
□	Niveau calculation area

Length scale 1:2887



KR Puram to Kempegowda International Airport

Operational Noise
 Analysis: Street Map and Grade-Earth
 Train noise power levels taken from EMU Soundplan 8.1 Library and
 BMRC Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2031.2b with Parapet Wall
 Noise Contour Map
 Leq,n**
 Calculation in 1.5 m above ground

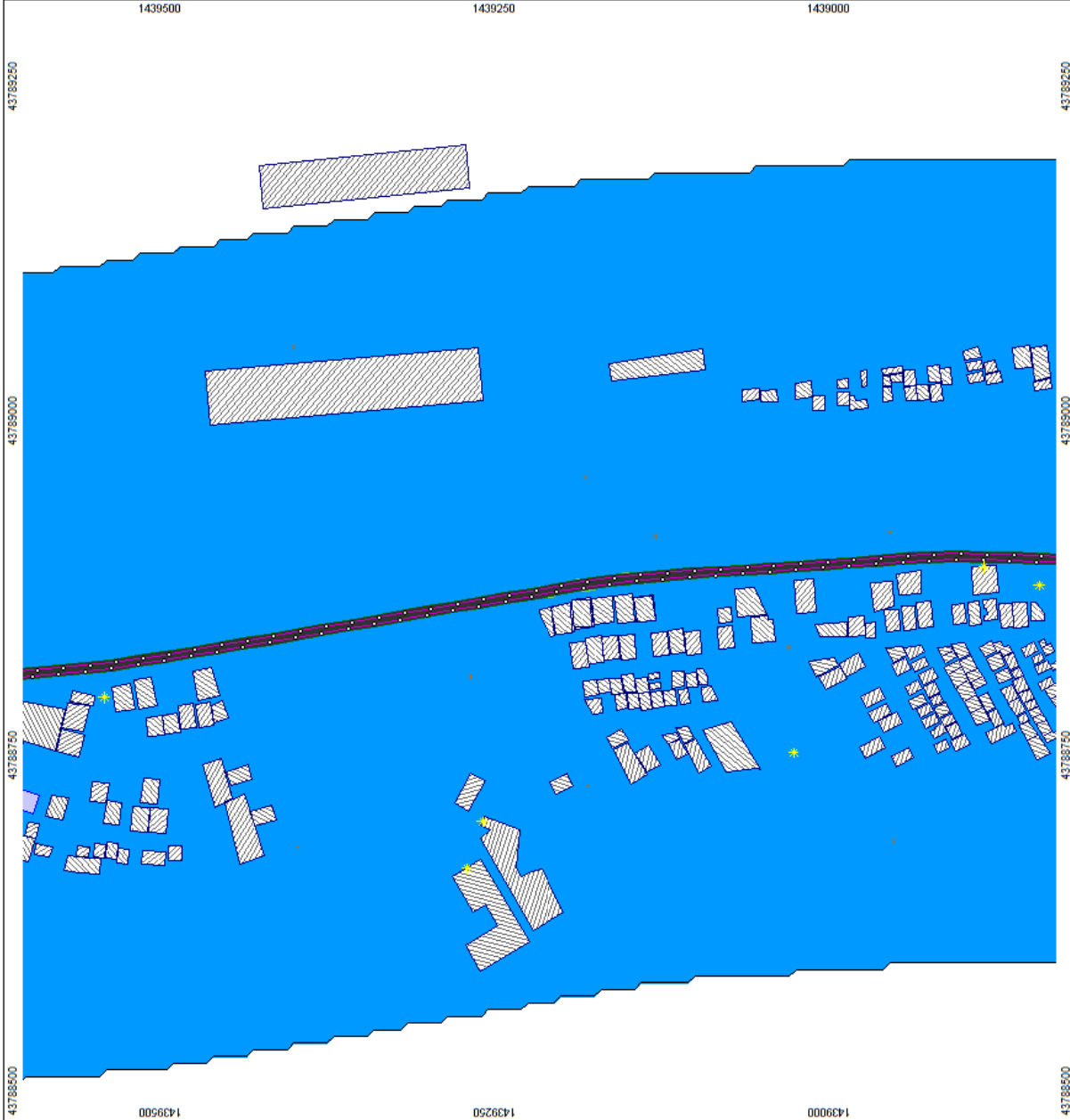
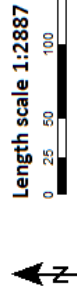
Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n
 in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
+3dB(A) increase from
Point Sources
Line source
Geometry bitmap
Wall
Wall
Elevation point
Bodemeffekte
Noise calculation area



KR Puram to Kempegowda International Airport

Operational Route:
Buildings from Street Map and Google Earth.
Train noise power levels taken from DMU Specification 8.1 Library and
subject to being back-specified, train standard and
speeds from train body body.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**

Calculation in: 1.5 m above ground

Project engineer: CMH
Created: 10/10/2010
Revised with boundary: 8.1. Update: 16/03/2018



**Levels Leq,d
in dB(A)**



Signs and symbols

- Construction Equip
- Main building
- ★ Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Wall
- Elevation point
- Bodenreflekt
- Noise calculation area



KR Puram to Kempgowda International Airport

Operational Noise.
Buildings from Street Map and Google Earth.
Train noise power levels taken from DMU Soundplan 8.1 Library and
BMRCI Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

120 2031 2b with Parapet Wall
Noise Contour Map
Leq_{1h}
Calculation in 1.5 m above ground

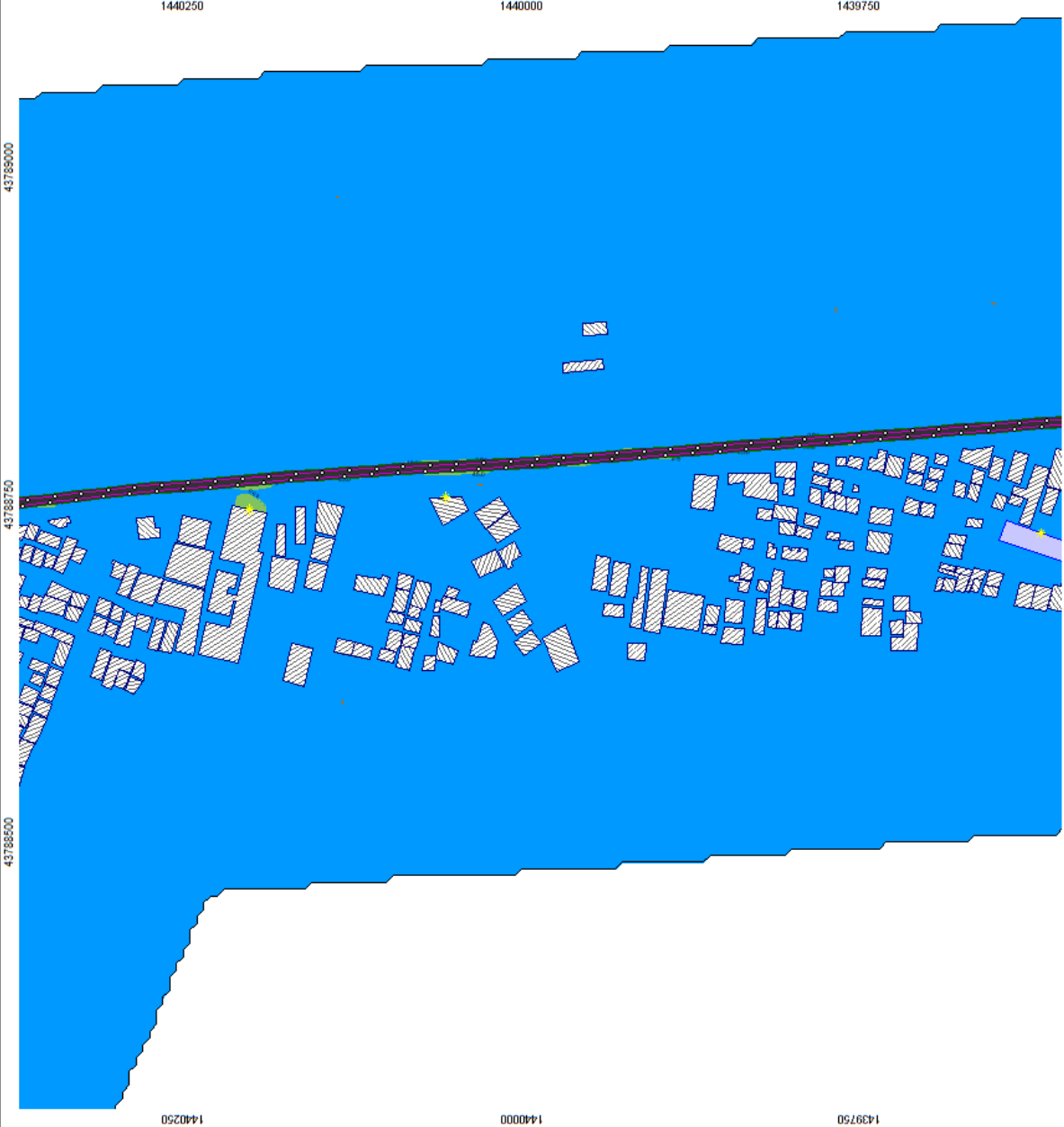
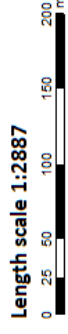
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq_{1h}
in dB(A)



Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry blimap
- Wall
- Wall
- Elevation point
- Bodeneffekte
- Noise calculation area

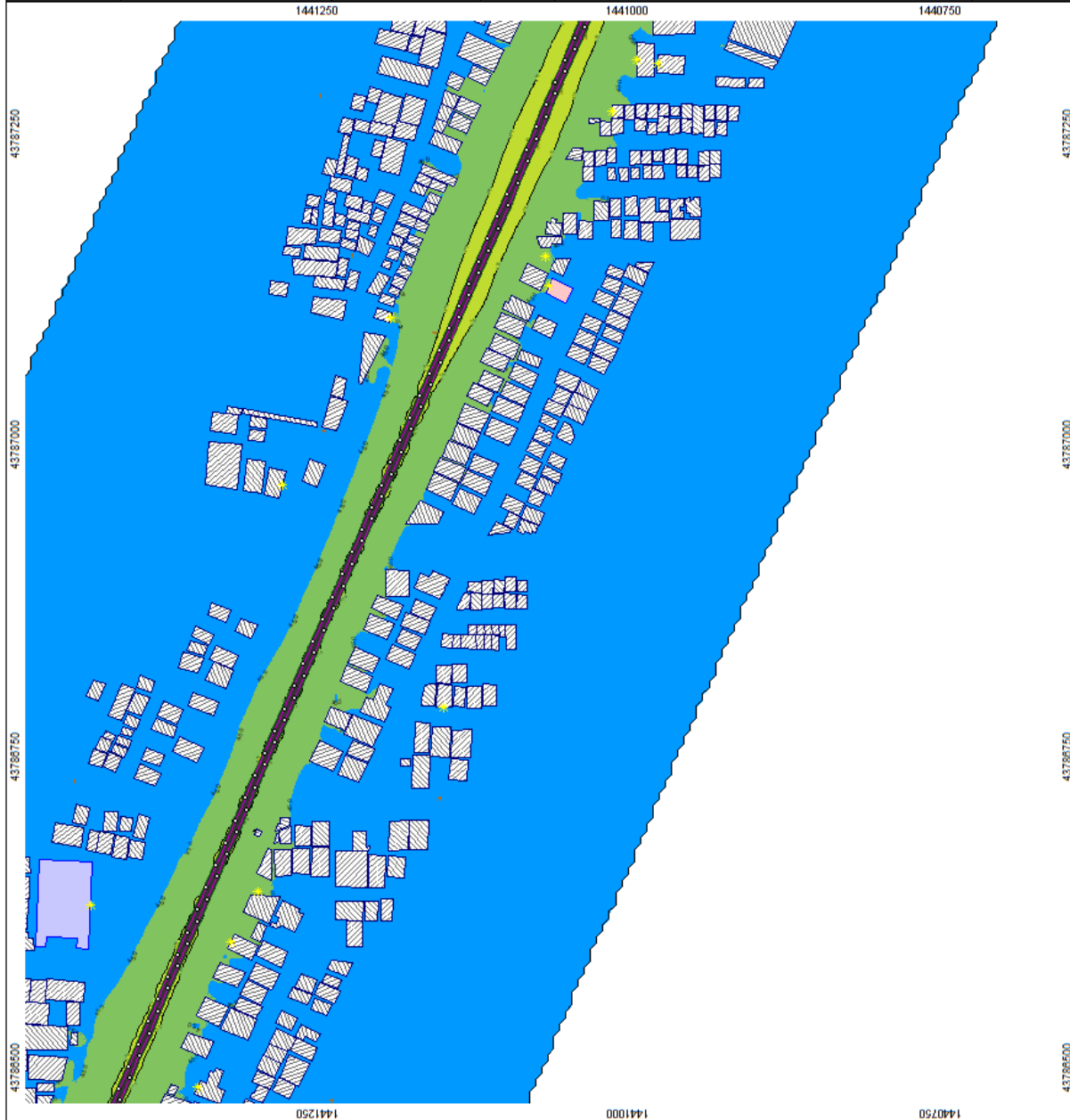


KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Receiver power levels taken from BMU SoundPLAN 8.1. Library and
BANC building shapes and location. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018



**Levels Leq,d
in dB(A)**



Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodeneffekte
- Interpretation area



KR Puram to Kemppegowda International Airport

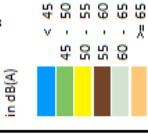
Operational Noise
 Noise Contour Map and Grade Earth
 Train noise power levels taken from EMU Soundplan 8.1 Library and
 BMRC Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2031.2b with Parapet Wall
 Noise Contour Map**

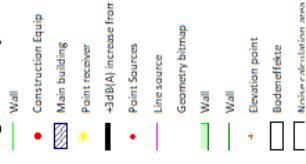
Leq,n
 Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n
 in dB(A)



Signs and symbols



Length scale 1:3101



43787250

43787000

43786750

43786500

KR Puram to Kemppegowda International Airport

Operational Noise, Buildings from Street Map and Google Earth. Train noise power levels taken from EMU Soundplan 8.1 Library and BMRC Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

120 2031 2b with Parapet Wall Noise Contour Map

Leq,d
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,d in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Construction track
Main building
Point source
ADBCI increase line
Point source
Ultra source
Emergency stop
Wall
Wall
Elevation point
Acoustic plate
Water calculation area

Length scale 1:3101

0 25 50 100 150 200 m



KR Puram to Kemppegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from EMU Soundplan 8.1 Library and
BMRCI Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map**

Leq_{p,n}
Calculation in 1.5 m above ground

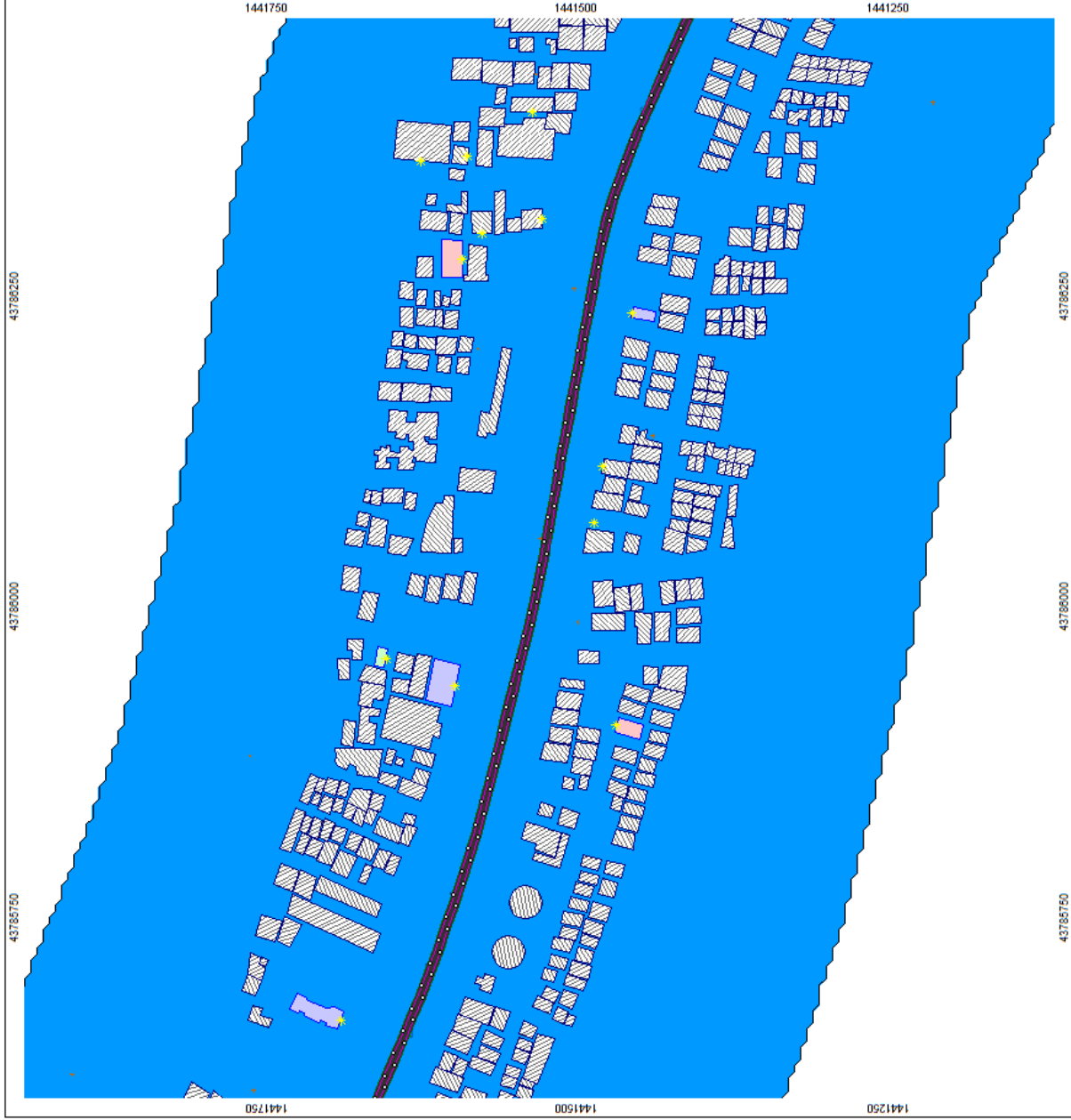
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq_{p,n}
in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
-3dB(A) increase from
Point Sources
Line source
Geometry bitmap
Wall
Wall
Elevation point
Bodeneffekte
Noise reduction area

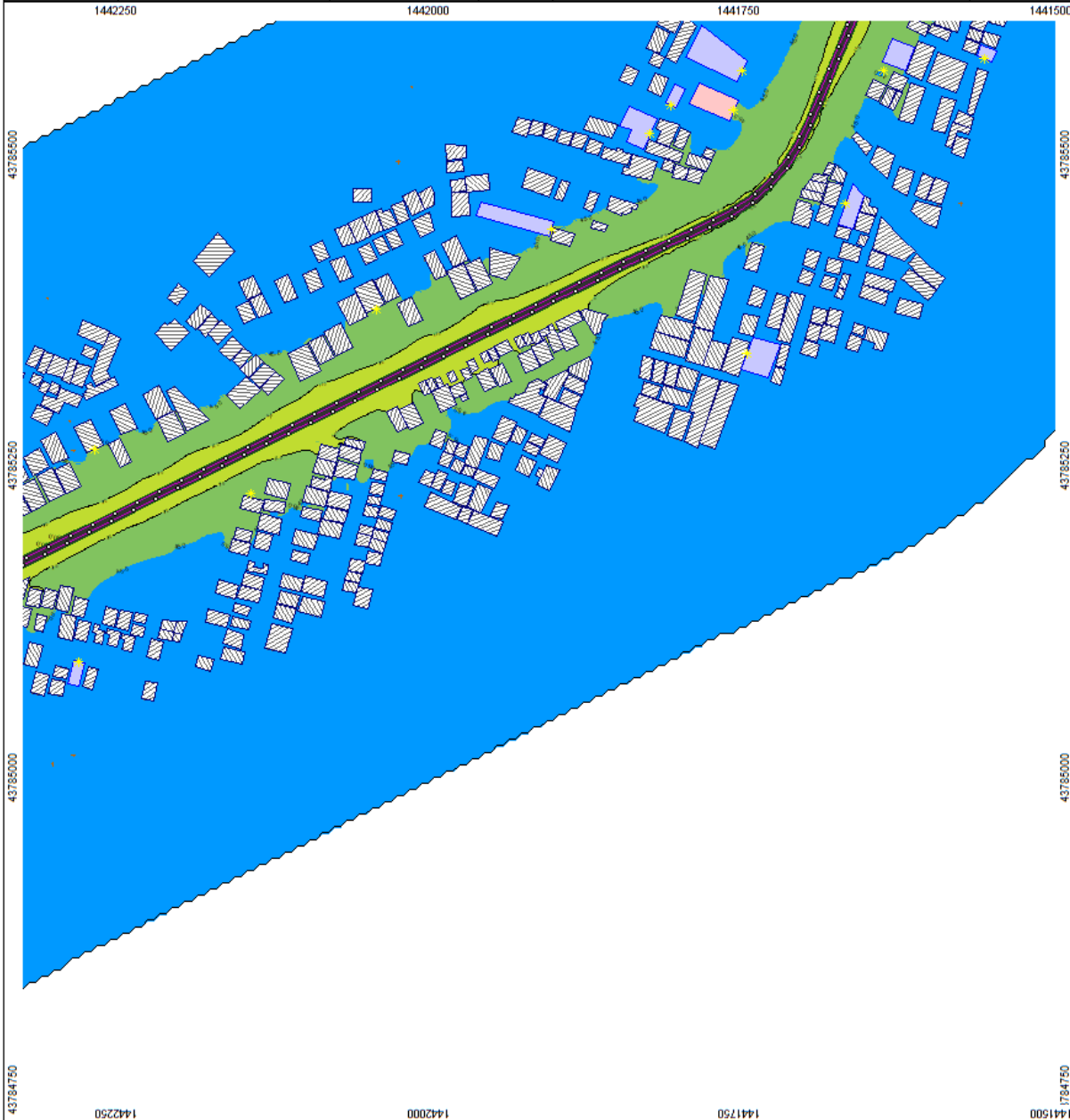


KR Puram to Kempegowda International Airport

Operational Noise: Contour Map and Grade Earth. Train noise levels taken from EMU Soundplan 8.1 Library and BMIRCL Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

120 2031 2b with Parapet Wall Noise Contour Map
Leq,d
 Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 10/02/2018
 Processed with SoundPLAN 8.1, Update 10/23/2018



Levels Leq,d in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodemeffekte
- Noise calculation area

Length scale 1:3101



43784750

1442250

1442000

1441750

43785000

KR Puram to Kempgowda International Airport

Operational Noise:
 Based on Street Map and Google Earth.
 Train noise power levels taken from EMU Soundplan 8.1 Library and
 BMRC Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
 Noise Contour Map**

Leq,n
 Calculation in 1.5 m above ground

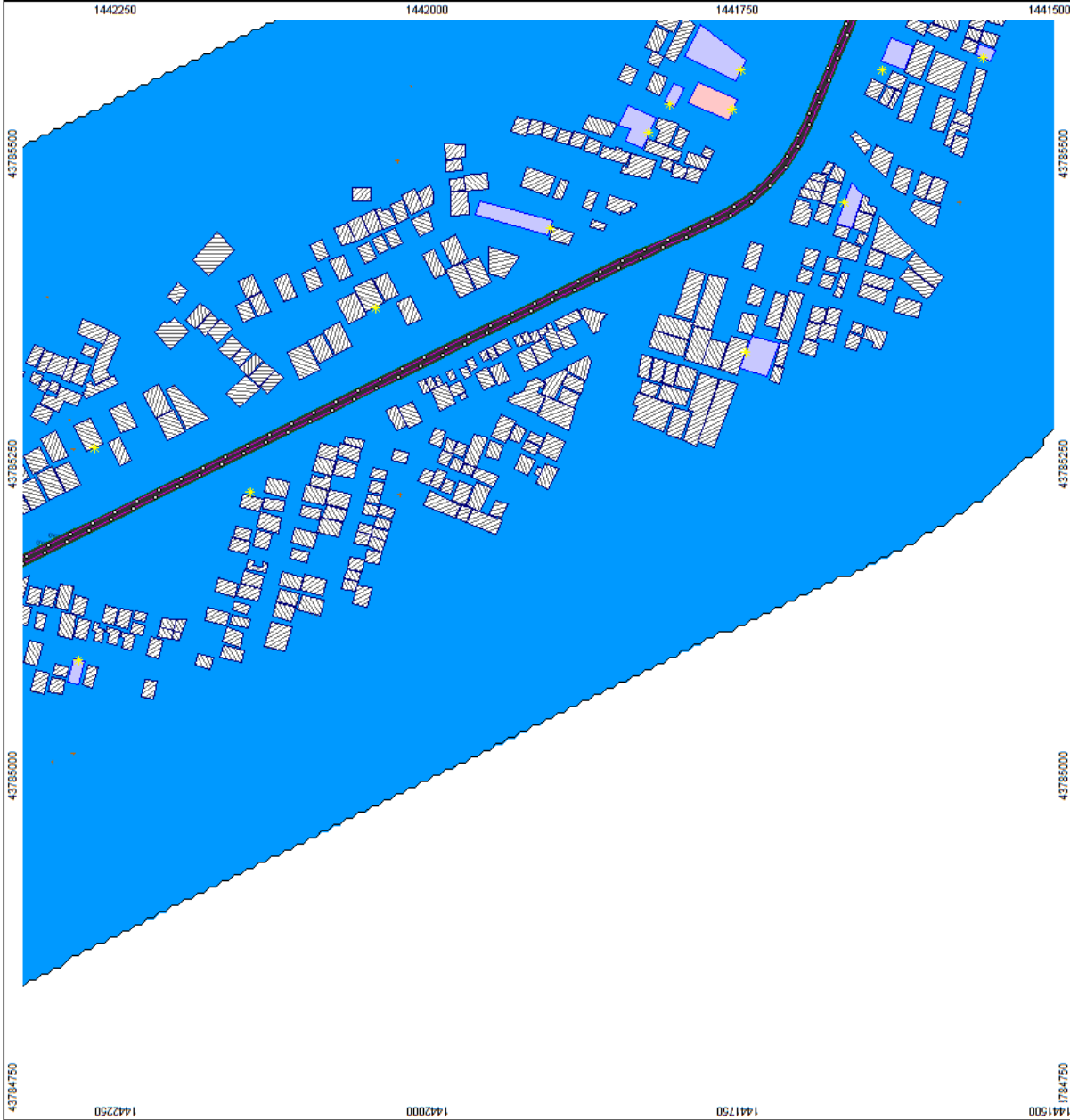
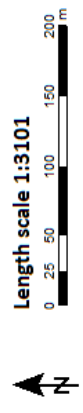
Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,n
 in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
+3dB(A) increase from
Point Sources
Line source
Geometry bitmap
Wall
Wall
Elevation point
Bodeneffekte
Noise reduction area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Growth Earth
BANK Building Stock Specifications: Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project engineer: DMK
Contract: J1010120
Produced with SoundPLAN 8.1. Update: 2022.03.03.18

Levels Leq,d
in dB(A)

≤ 45
45 - 50
50 - 55
55 - 60
60 - 65
≥ 65

Signs and symbols

Wall
Construction fence
Multi building
Point receiver
-3dB(A) increase free
Point Source
Line source
Greenery barrier
Wall
Wall
Elevation point
Bottomplate
Noise calculation area



KR Puram to Kemppegowda International Airport

Operational Noise:
 Buildings from Street Map and Google Earth.
 Topography from SRTM30 PLUS and BMLJ Soudhan 8.1 Library and
 BMLCL Building Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
 Noise Contour Map
 Leq,n**
 Calculation in 1.5 m above ground

Project engineer: CMR
 Created on: 07/07/2020
 Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n
 in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall	Construction Equip
Main building	Point receiver
Point receiver	-3dB(A) increase from
Point Sources	Line source
Line source	Geometry bitmap
Geometry bitmap	Wall
Wall	Elevation point
Elevation point	Bodeneffekte
Bodeneffekte	Noise calculation areas

Length scale 1:3101
 0 25 50 100 150 200 m

North arrow pointing up.



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise contours from BMU Soundplan 8.1 Library and
BAMBI Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/1/2020
Processed with SoundPLAN 8.1, Update 10/23/2018



KR Puram to Kempgowda International Airport

Operational Noise:
 Operational Noise Contour Map and Grade/Earth
 Train noise levels taken from EMU Soundplan 8.1 Library and
 BMRC Rolling Stock Specification, Train schedule and
 speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
 Noise Contour Map
 Leq,n**
 Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,n
 in dB(A)



Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- +dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodeneffekte
- Noise calculation area

Length scale 1:2727



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from DMU Soundplan 8.1 Library and
BMRCL Home Station Application. Train schedule and
speeds from feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,d
in dB(A)

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	>= 65

Signs and symbols

Green line	Construction Equire
Red line	Wall
Blue hatched	Main building
Yellow hatched	Partial building
Black line	-3dB(A) increase floor
Red line	Point Source
Green line	Line source
Green line	Geometry linkage
Green line	Wall
Orange dot	Developer point
White box	Soundproofness
White box	Noise sensitive zones



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from DMU Soundplan 8.1 Library and
BMRCC Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,1n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

- Levels Leq,1n**
In dB(A)
- < 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - ≥ 65
- Signs and symbols**
- Wall
 - Construction Equip
 - Main building
 - Point receiver
 - +3dB(A) increase from
 - Point Sources
 - Line source
 - Geometry bitmap
 - Wall
 - Wall
 - Elevation point
 - Bodeneffekte
 - Noise reduction areas

Length scale 1:2727



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from DMU Soundplan 8.1 Library and
BMRCC Rolling Stock Specifications. Train schedule and
speeds from feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

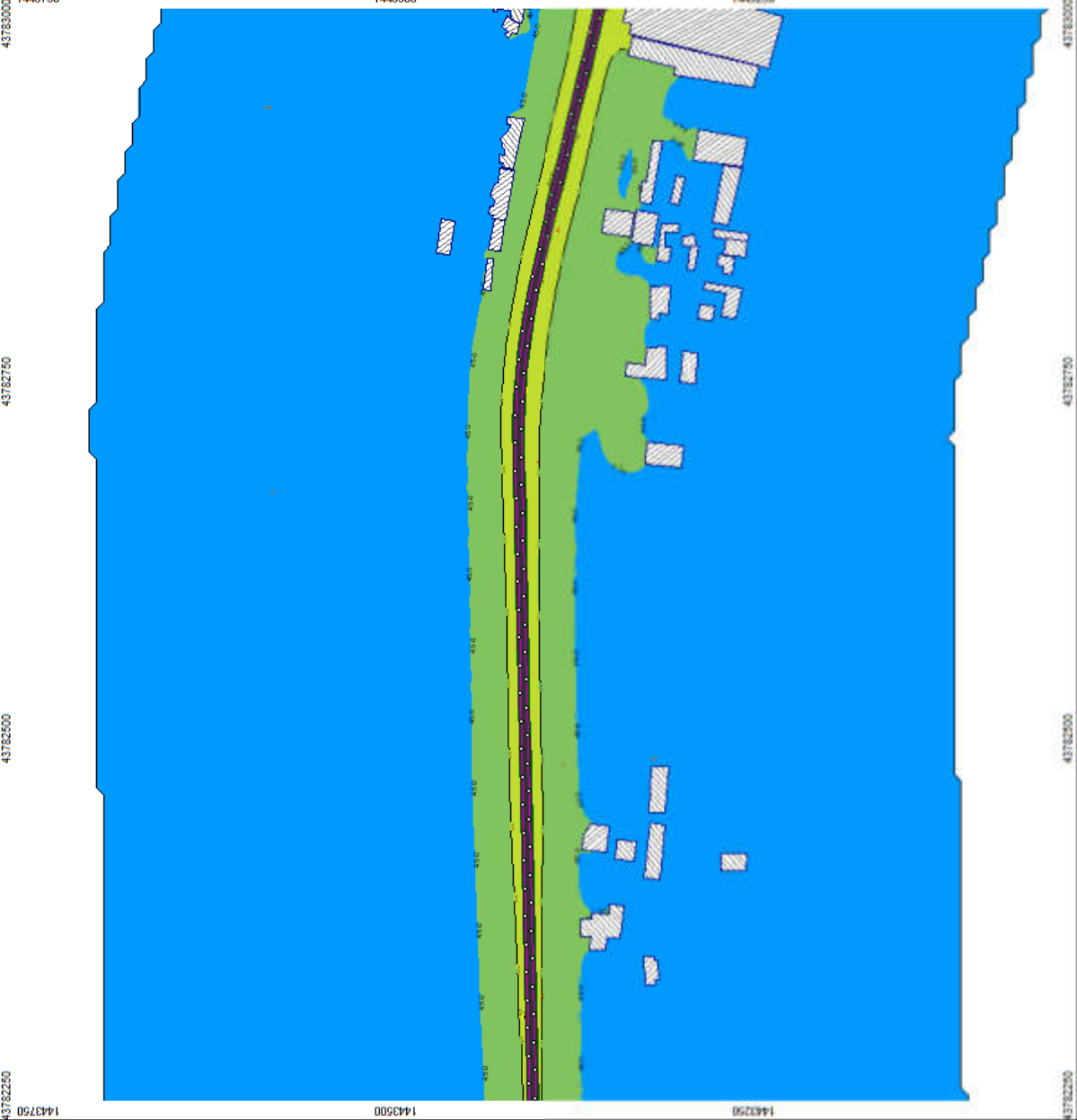
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

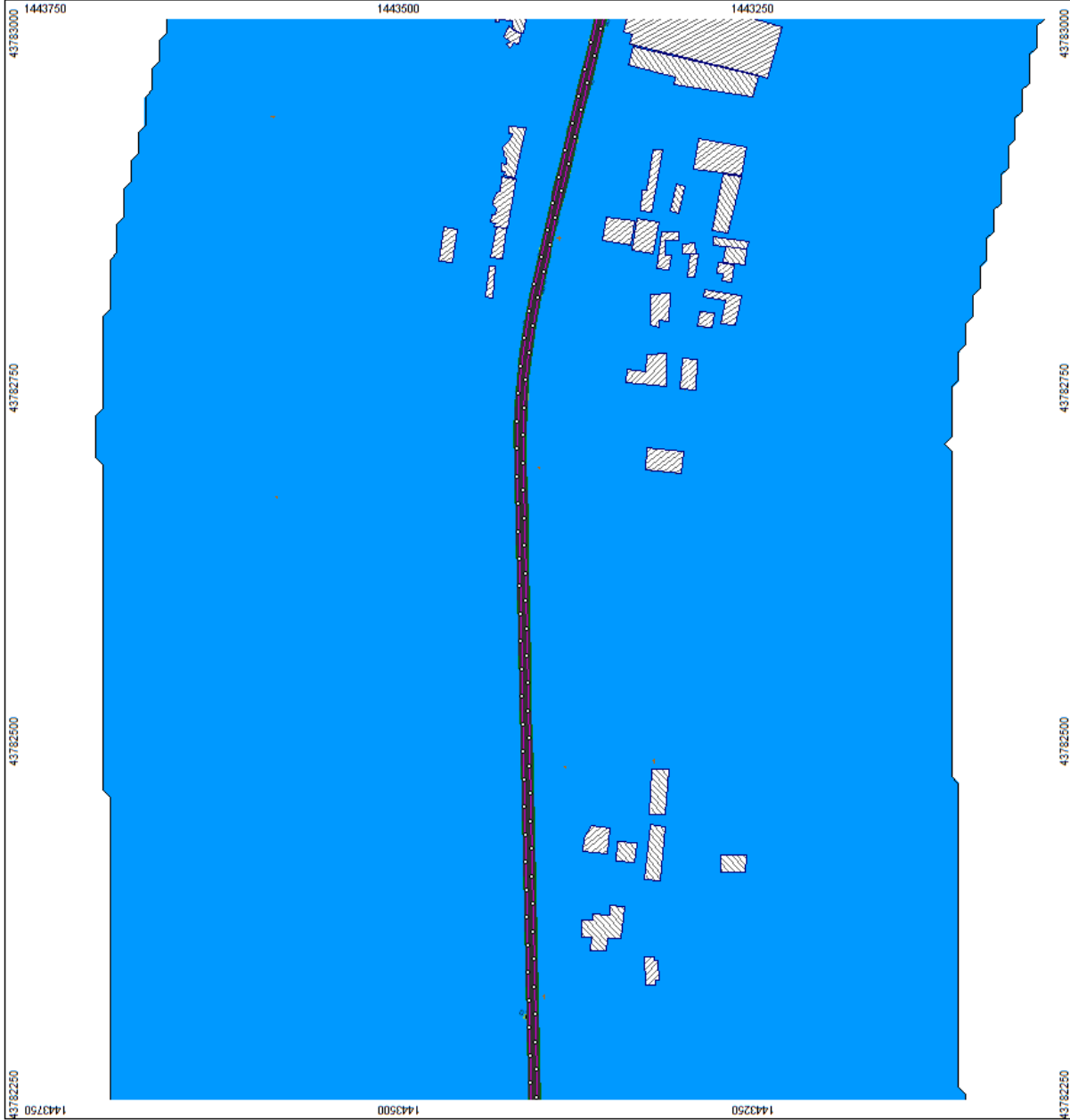
Levels Leq,d
(in dB(A))

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	>= 65

Signs and symbols

Green line	Construction Equity
Red line	Wall
Blue rectangle	Main building
Yellow rectangle	Point receiver
Black line	-3.5dB(A) Anomalous Effect
Red line	Point Sources
Purple line	Live sources
Green line	Geometry (curves)
Green line	Wall
Yellow star	Elevation point
White rectangle	Building edge
White rectangle	Reference elevation point





KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth
Topography from DEM (EMU Soundplan 8.1 Library and
BMRCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2031.2b with Parapet Wall
Noise Contour Map**
Leq,n
Calculation in 1.5 m above ground

Project engineer: CMR
Project: 91020200
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n
in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
+3dB(A) increase from
Point Sources
Line source
Geometry bitmap
Wall
Wall
Elevation point
Bodeneffekte
Noise calculation area

Length scale 1:2727

0 25 50 100 150 200

↑ N

KR Puram to Kempegowda International Airport

Operational Noise
 Buildings from Street Map and Google Earth.
 The noise contours are taken from 200 Surrounding L.L. Library and
 MATHS for zoning levels. The noise contours are taken from
 Google Earth for building footprints. The noise contours are
 taken from feasibility study.

**120 2031 2b with Parapet Wall
 Noise Contour Map
 Leq,d**

Calculation in 1.5 m above ground

Project engineer: DMH
 Created: 3/10/2020
 Produced with soundPLAN 8.11. Update: 10/01/2021

Levels Leq,d in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Wall
- Construction fence
- Main building
- Point receiver
- +3 dB(A) increase from
- Point Source
- Line source
- Geometry blockup
- Wall
- Wall
- Excavator point
- Bedlamfläche
- Noise-reducing area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Line noise power levels from EMU Soundplan 8.1 Library and
BNAEC. Timing block calculation. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map**

Leq,n
Calculation in 1.5 m above ground

Project engineer: OMR
Created: 31/10/2018
Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,n in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
+3dB(A) increase from
Point Sources
Line source
Geometry blurring
Wall
Wall
Elevation point
Bodenfläche
Receiver calculation area



KR Puram to Kempgowda International Airport

Operational Noise
 Building from Street Map and Google Earth.
 Train noise power levels taken from EMU Soundplan 8.1 Library and
 BMIRCL Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
 Noise Contour Map**

Leq,d
 Calculation in 1.5 m above ground

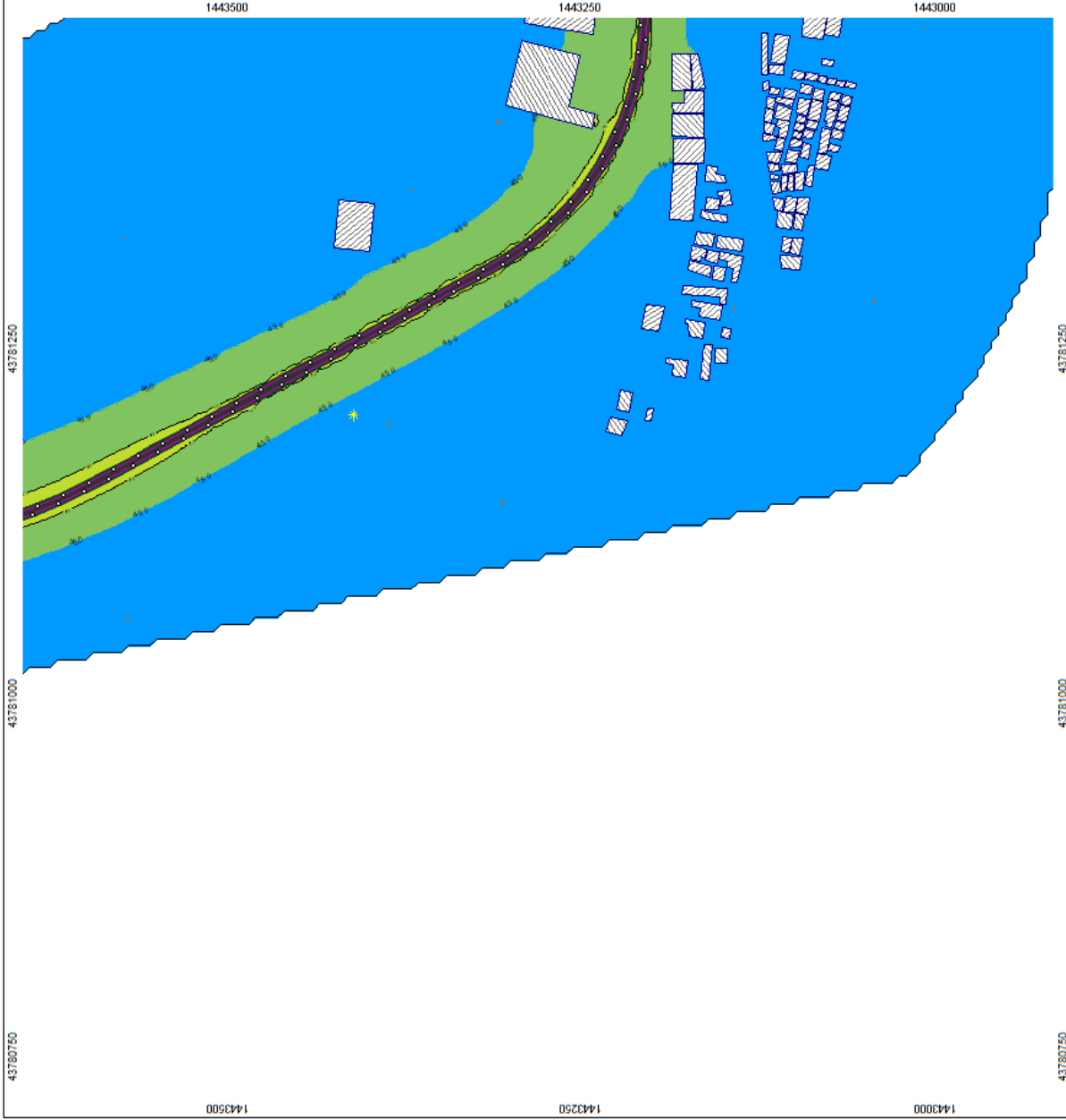
Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,d
 in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
-3dB(A) increase from
Point Sources
Line source
Geometry bitmap
Wall
Wall
Elevation point
Bodenreflekt
Noise calculation area

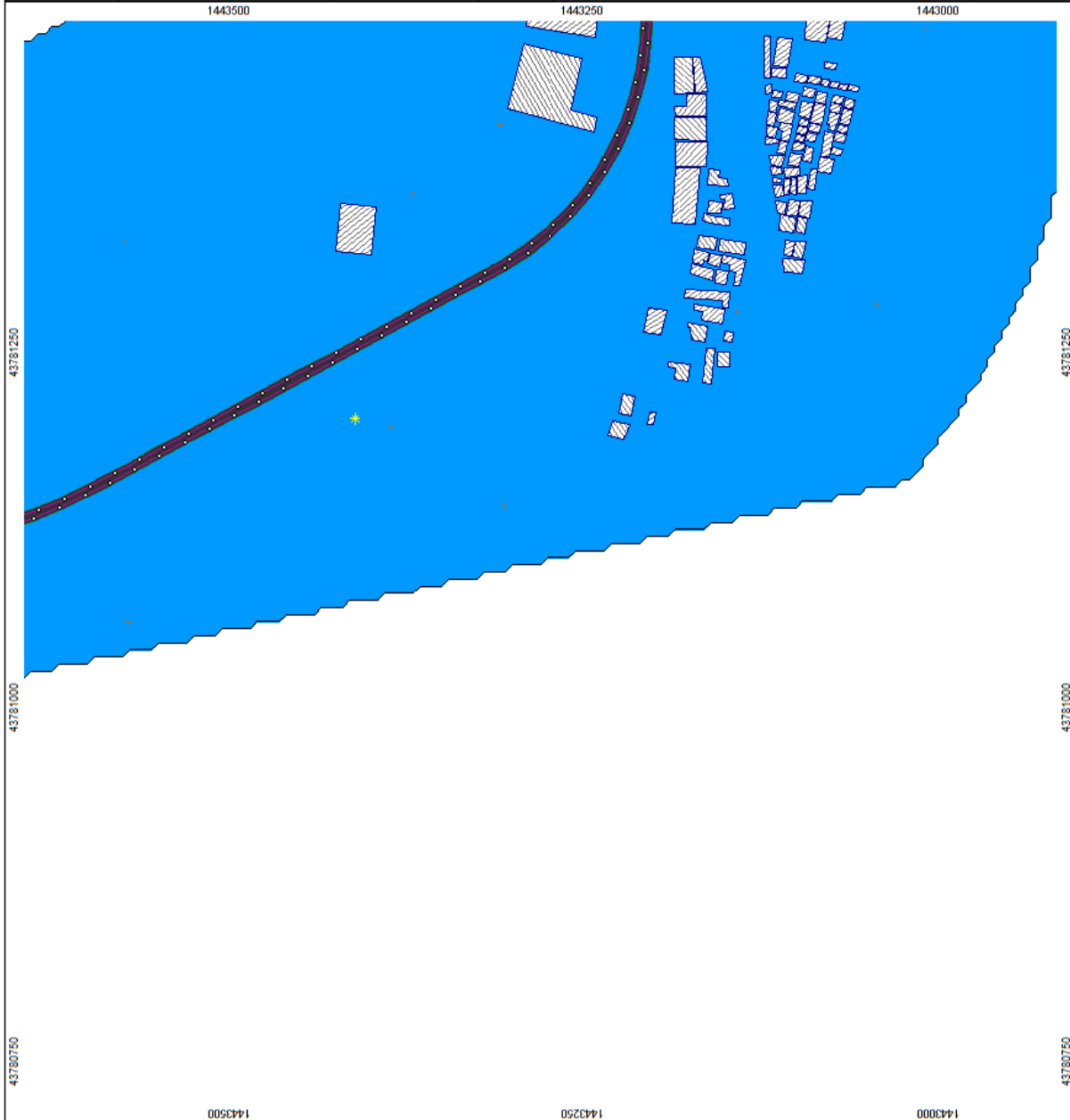


KR Puram to Kempgowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Construction Noise: From the construction schedule. 8.1 Library and
BMBCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1. Update 10/23/2018



**Levels Leq,n
in dB(A)**

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodenfläche
- Verkehrslinien

Length scale 1:2727



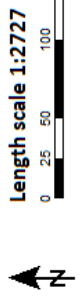
KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise power levels taken from DMU Soundplan 8.1 Library and
BMRCC Noise Study Specification. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/11/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

- Levels Leq,n**
in dB(A)
- < 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - >= 65
- Signs and symbols**
- Construction Equip
 - Main building
 - Point receiver
 - +3dB(A) increase from
 - Point Sources
 - Line source
 - Geometry bitmap
 - Wall
 - Wall
 - Elevation point
 - Bodeneffekte
 - Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Green Meadows and Georgia South.
Noise contours are taken from ICAO Standard B.L. Library and
MAD (Modeling and Assessment) Software.
Noise from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

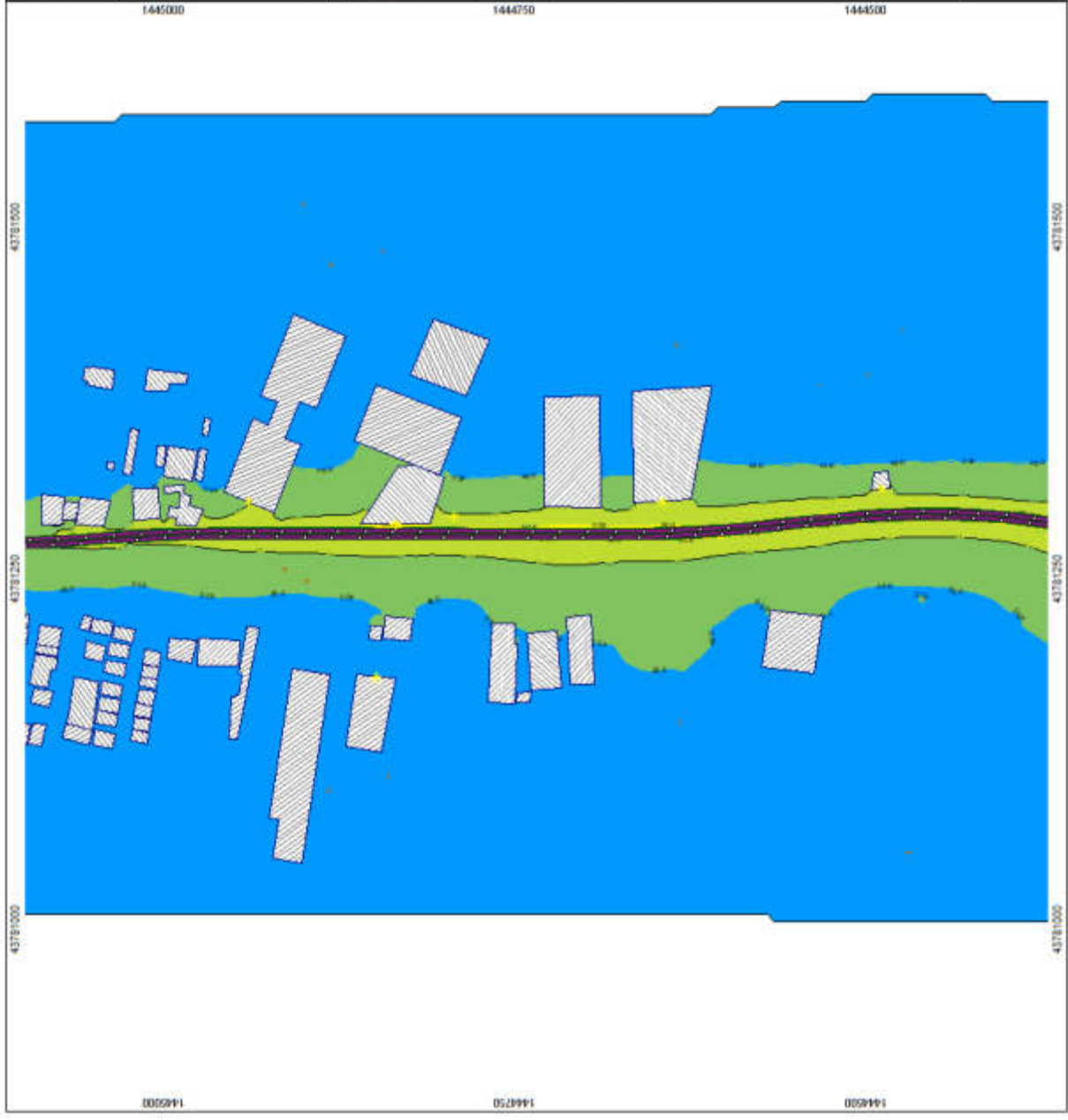
Project engineer: CMR
Created: 9/10/2020
Provided with SoundPLAN 8.1.1, Update 10/21/2018

Levels Leq,d
in dB(A)

- ≤ 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Construction Equip.
- Main building
- Point receiver
- +10dB(A) increase from
- Point Source
- Line Source
- Geometry change
- Wall
- Diversion point
- Reflection
- Acoustic reflective area



KR Puram to Kempegowda International Airport

Operational Noise:
 Building from Street Map and Google Earth.
 Noise contours are based on the ILMU Sound Model
 (BMRCL Rolling Stock Specification, Train schedule and
 speeds from Feasibility Study).

**120 2031 2b with Parapet Wall
 Noise Contour Map
 Leq,n**
 Calculation in 1.5 m above ground

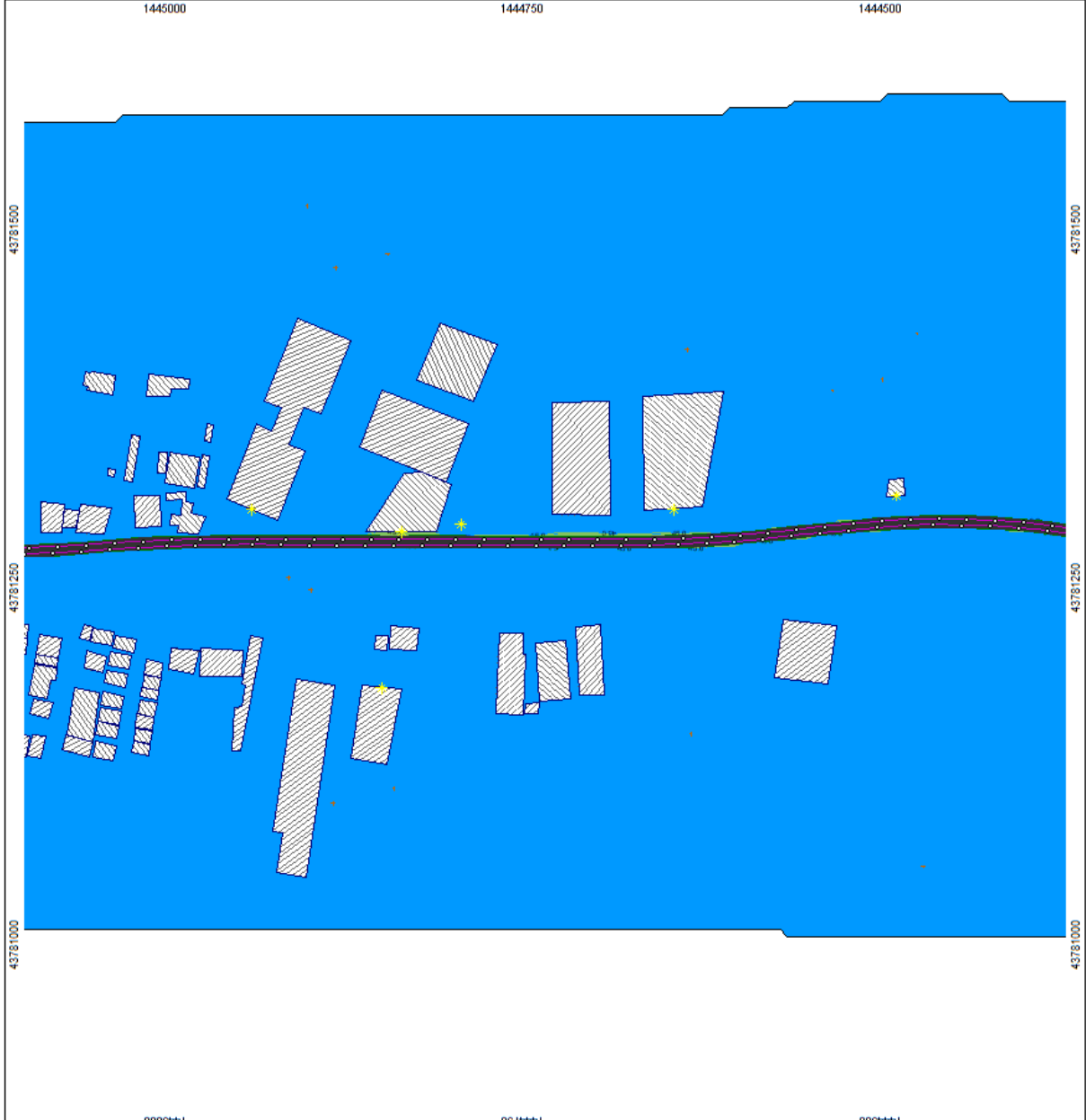
Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n
 in dB(A)

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	>= 65

Signs and symbols

Green line	Wall
Red dot	Construction Equip
Blue hatched box	Main building
Yellow star	Point receiver
Black line	+3dB(A) increase from
Black dot	Point Sources
Purple line	Line source
Green hatched box	Geometry bitmap
Green line	Wall
Green line	Wall
Green line	Elevation point
White box	Bodeneffekte
White box	Notverkehrslinien area



KR Puram to Kempegowda International Airport

Operational flights:
 Buildings from Street Map and Google Earth.
 Terrain and ground level from DEM, contour lines from SRTM30 PLUS and
 MNCI and ground level from SRTM30 PLUS. Terrain visualization and
 speech from readability study.

**120 2031 2b with Parapet Wall
 Noise Contour Map
 Leq,d**

Calculation in 1.5 m above ground

Project engineer: DMK
 Contact: 91000000
 Prepared with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,d
 in dB(A)

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	≥ 65

Signs and symbols

Red dot	Construction site
Blue hatched box	Main building
Yellow dot	Point receiver
Black line	-3dB(A) increase from
Red dot	Point Source
Pink line	Line source
Green line	Geometry (strip)
Green line	Wall
Green line	Wall
Red star	Elevation point
White box	Background
White box	Reference elevation area



KR Puram to Kempegowda International Airport

Operational Noise:
 Operational Map and Google Earth
 from receiver levels taken from EMU Soundplan 8.1 Library and
 BMIRCL Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
 Noise Contour Map**

Leq,n
 Calculation in 1.5 m above ground

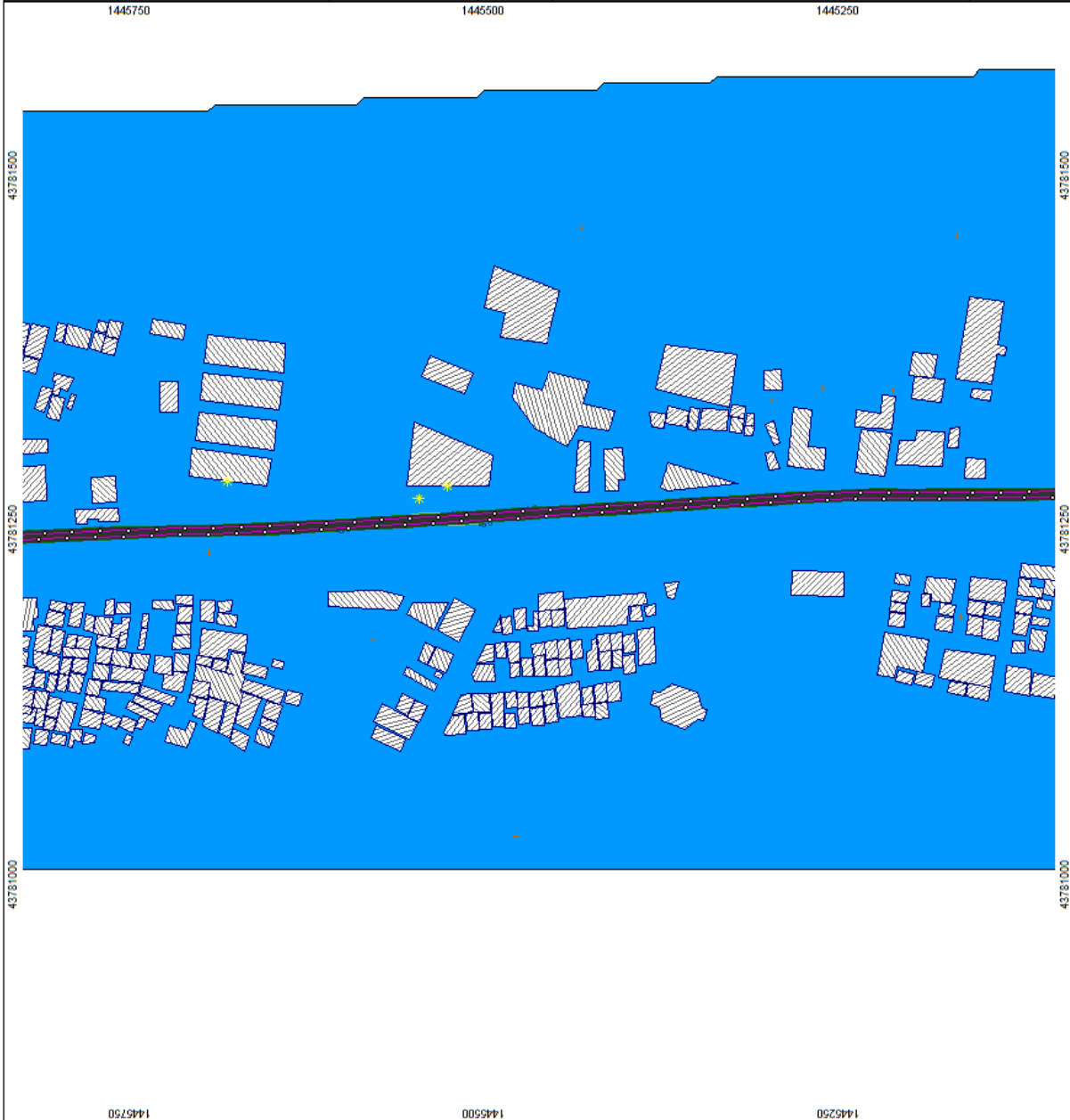
Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,n in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- ≥ 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bottomeflate
- Noise calculation area



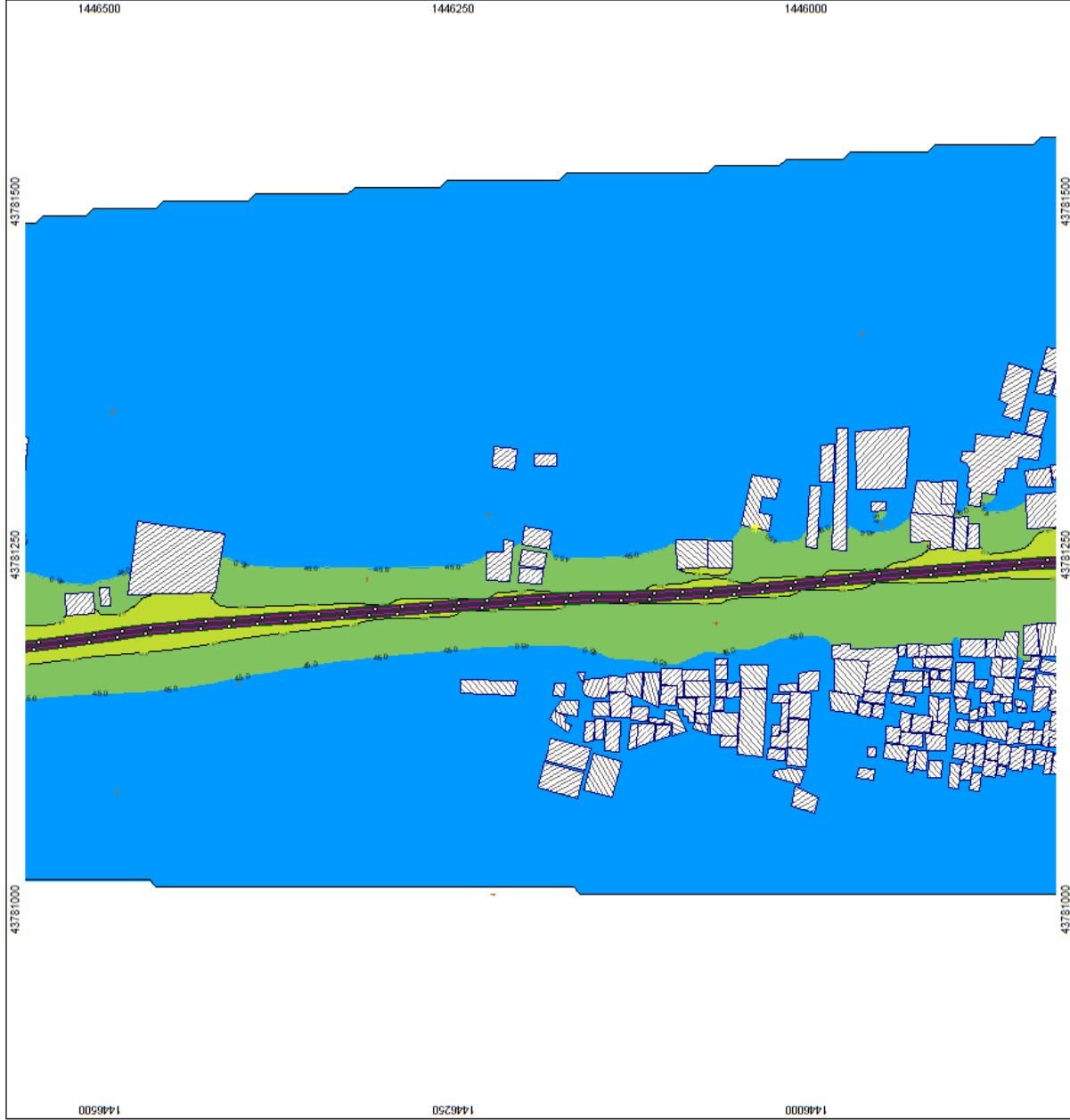
KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise levels were taken from BIMU Soundmap 8.1 Library and BIMU Modeling Studio. Location, train schedule and speeds from feasibility study.

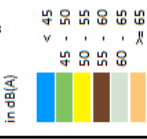
**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**

Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018



**Levels Leq,d
in dB(A)**



Signs and symbols

- Construction Equip
- Main building
- ★ Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Wall
- Elevation point
- Bodeneffekte
- Nicht-radiativem area

Length scale 1:2727



KR Puram to Kempegowda International Airport

Operational Noise:
 Buildings from Street Map and Google Earth.
 Noise power level is taken from B10 Soundplan 8.1 Library and
 BMRCL Engineering Services. Station, Train schedule and
 speeds from feasibility Study.

**120 2031 2b with Parapet Wall
 Noise Contour Map**

Leq,n
 Calculation in 1.5 m above ground

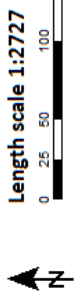
Project engineer: CMR
 Created: 9/10/2020
 Proceeded with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n
 in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Construction Equip
Main building
Point receiver
+3dB(A) increase from
Point Sources
Line source
Geometry bitmap
Wall
Elevation point
Bodeneffekte
Rechnergesteuerte area

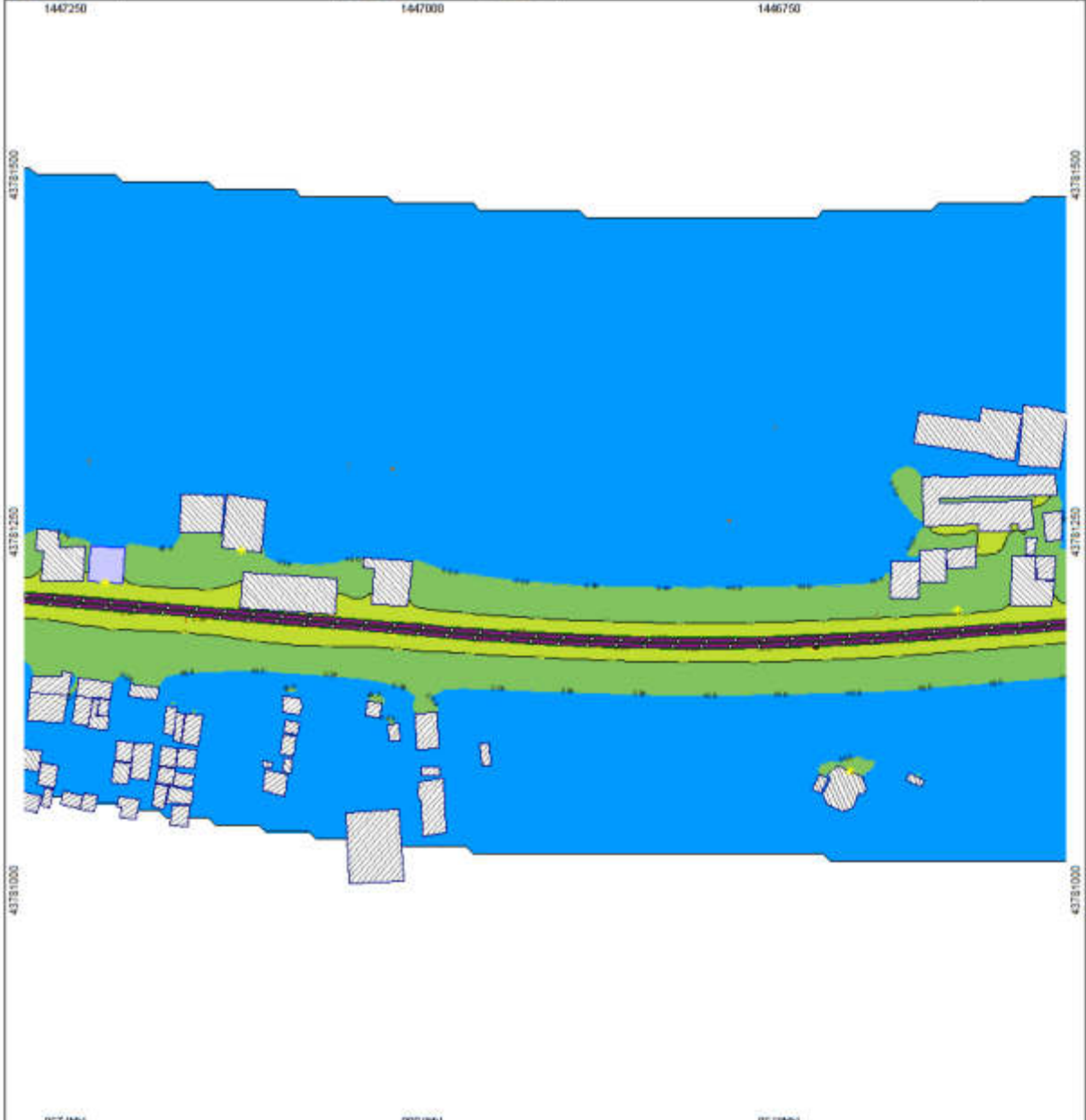


KR Puram to Kempegowda International Airport

Operations of Bus, Trains, Metro, and other public transport facilities. The study also includes the impact of noise on the surrounding area. The study is based on the data collected from the field and the available literature.

120 2031 2b with Parapet Wall Noise Contour Map
Leq,d
 Calculation in 1.5 m above ground

Project engineer: DMH
 Revised: 15/02/2023
 Prepared with AutoCAD 2018 & 1. Update 16/02/2023



Levels Leq,d in dB(A)



Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry outline
- Wall
- Wall
- Elevation point
- Bottomplate
- Receptor location area

Length scale 1:2727

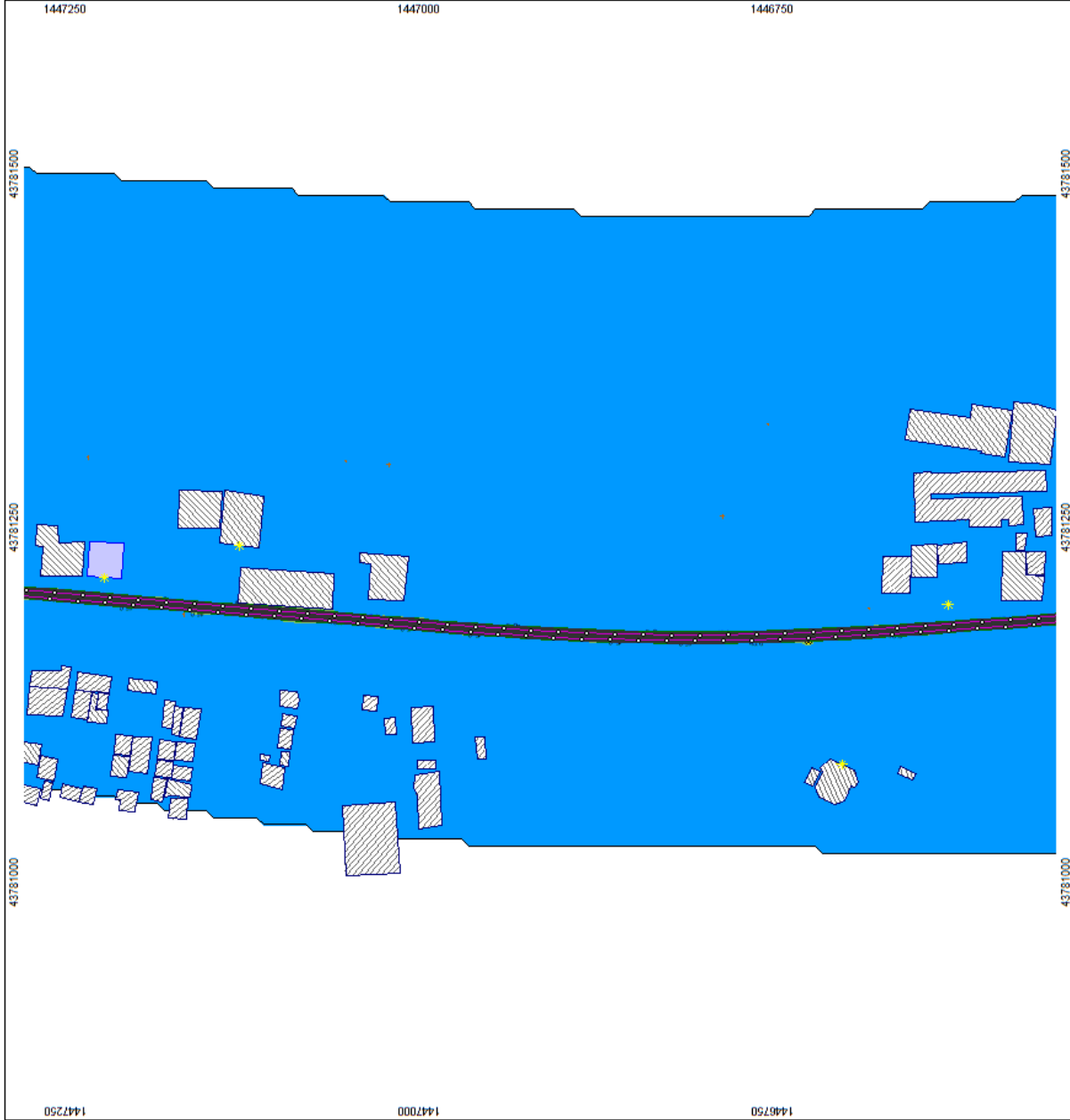


KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Streets Map and Google Earth.
Noise contours from the EMU Soundmap 8.1 Library and
BMRCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018



KR Puram to Kempegowda International Airport

Overhead Noise
Buildings from Street Map and Google Earth.
Noise contours were generated from the
MIMO, Building Inventory, and other data
from the Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project engineer: DMH
Contract: 3020203
Prepared with SoundPLAN 8.11, Update 1003/2018



KR Puram to Kemppegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise-power levels taken from EMU Soundplan 8.1 Library and
BIRACI Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,n
in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall	Construction Equip
Main building	Main building
Point receiver	Point receiver
+3dB(A) increase from	+3dB(A) increase from
Point Sources	Point Sources
Line source	Line source
Geometry binmap	Geometry binmap
Wall	Wall
Elevation point	Elevation point
Bodenreflekte	Bodenreflekte
Noise calculation area	Noise calculation area



KR Puram to Kempegowda International Airport

Operation of Hissak Building from Sound Map and Google Earth. The map shows the area from 1000 to 1000. The map shows the area from 1000 to 1000. The map shows the area from 1000 to 1000.

120 2031 2b with Parapet Wall Noise Contour Map

Leq,d
Calculation in 1.5 m above ground

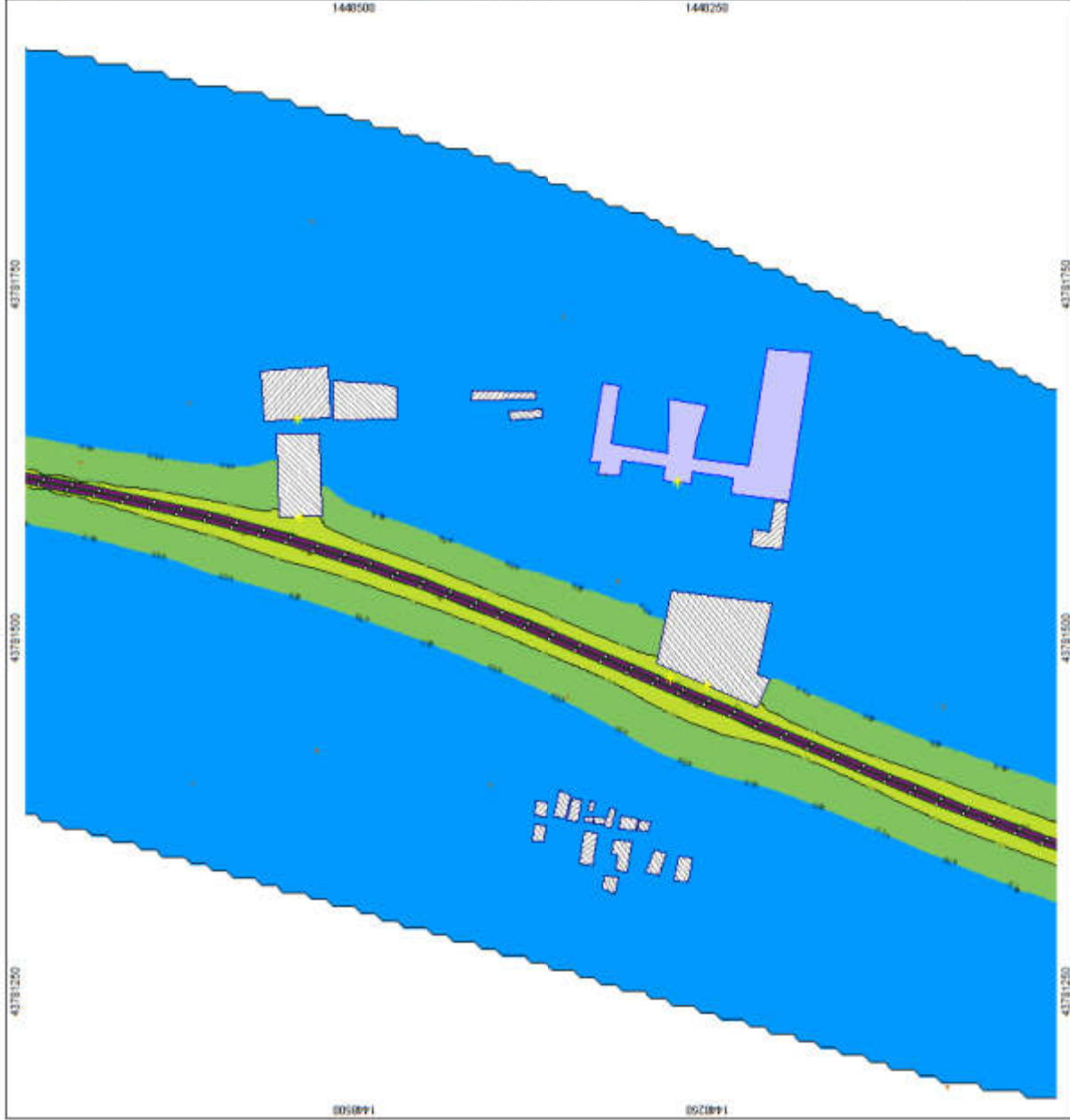
Project engineer: OMA
Client: MCDOT
Processor with AcousticPLAN 8.1, Update 100212018

Levels Leq,d in dB(A)

45
50
55
60
65
70

Signs and symbols

- Construction type:
 - Wall
 - Make building
 - Point receiver
 - Point Source
 - Line source
- Geometry (line):
 - Wall
 - Wall
 - Elevation point
 - Bottom/plate
 - Recurse/extension area



KR Puram to Kempegowda International Airport

Operational Noise
Buildings from Street Map and Google Earth.
Noise contours from the model. EMIU Soundmap
BMRCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

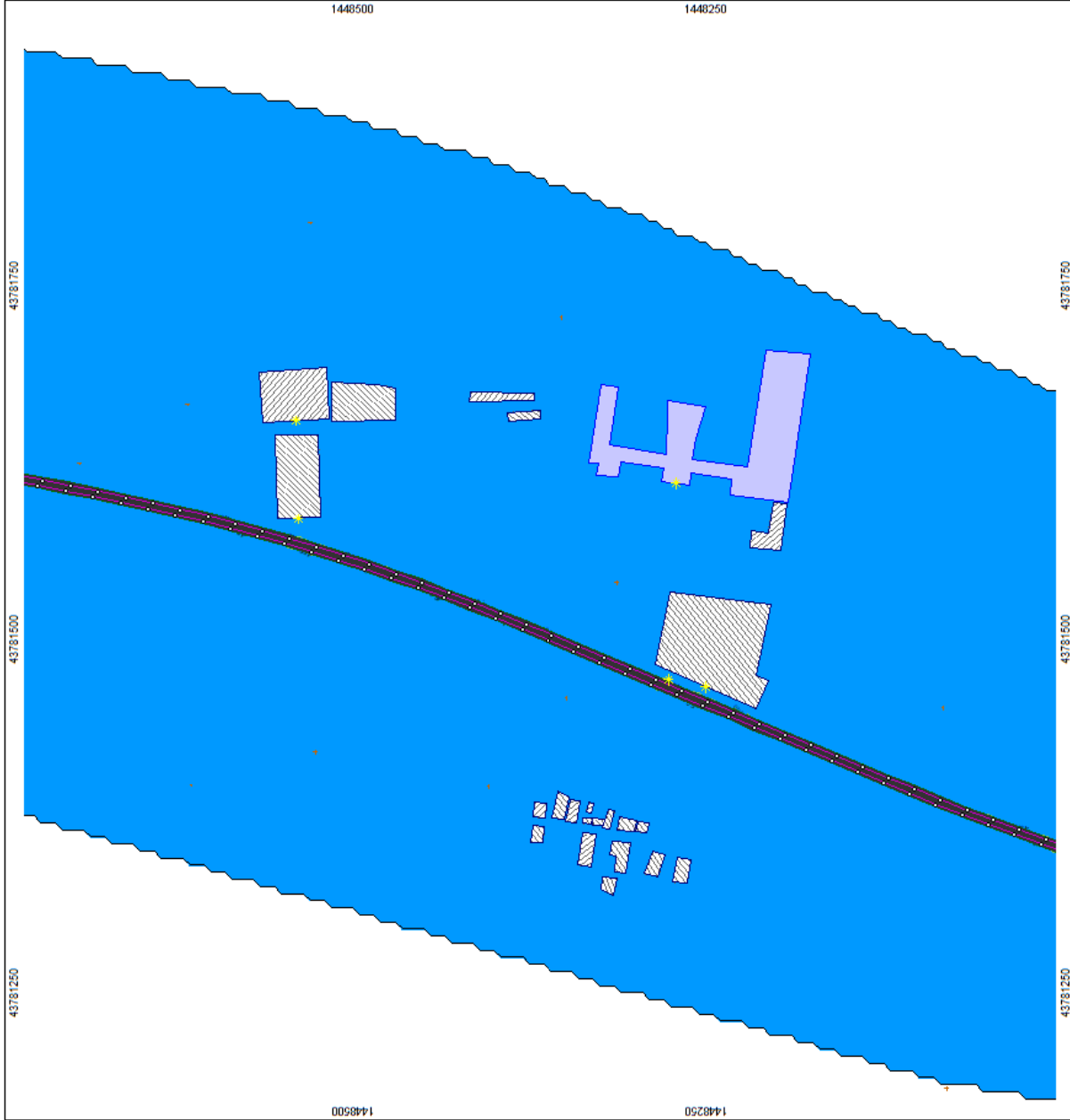
Project engineer: CMR
Created: 31/03/2018
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall	Construction Equip
Main building	Point receiver
Point receiver	+3dB(A) increase from
Point Sources	Line source
Line source	Geometry bitmap
Geometry bitmap	Wall
Wall	Elevation point
Elevation point	Bodemeffekte
Bodemeffekte	Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise:
 Building from Street Map and Google Earth
 The noise contours are based on the data from the
 MARL Building Stock Specifications, Train schedule and
 speech from Feasibility Study.

**120 2031.2b with Parapet Wall
 Noise Contour Map
 Leq,d**
 Calculation in 1.5 m above ground

Project engineer: DMH
 Created: 31/03/2010
 Processed with: SoundPLAN 8.1. Update 16/03/2018

Levels Leq,d
 in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Construction Equip	Wall
Main building	Main building
Point receiver	Point receiver
+3dB(A) increase from	Point Sources
Point Sources	Line source
Line source	Geometry blimp
Geometry blimp	Wall
Wall	Elevation point
Elevation point	Bodeneffekte
Bodeneffekte	Naturalisation areas
Naturalisation areas	



KR Puram to Kempgowda International Airport

Operational Noise:
 Height profile Map and Grade/Earth
 Train noise levels taken from EMU Soundplan 8.1 Library and
 BMIRCL Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
 Noise Contour Map
 Leq_n**

Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 19/10/2020
 Processed with SoundPLAN 8.1, Update 10/23/2018

**Levels Leq_n
 in dB(A)**



Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Wall
- Elevation point
- Bodeneffekte
- Noise calculation area

Length scale 1:2727

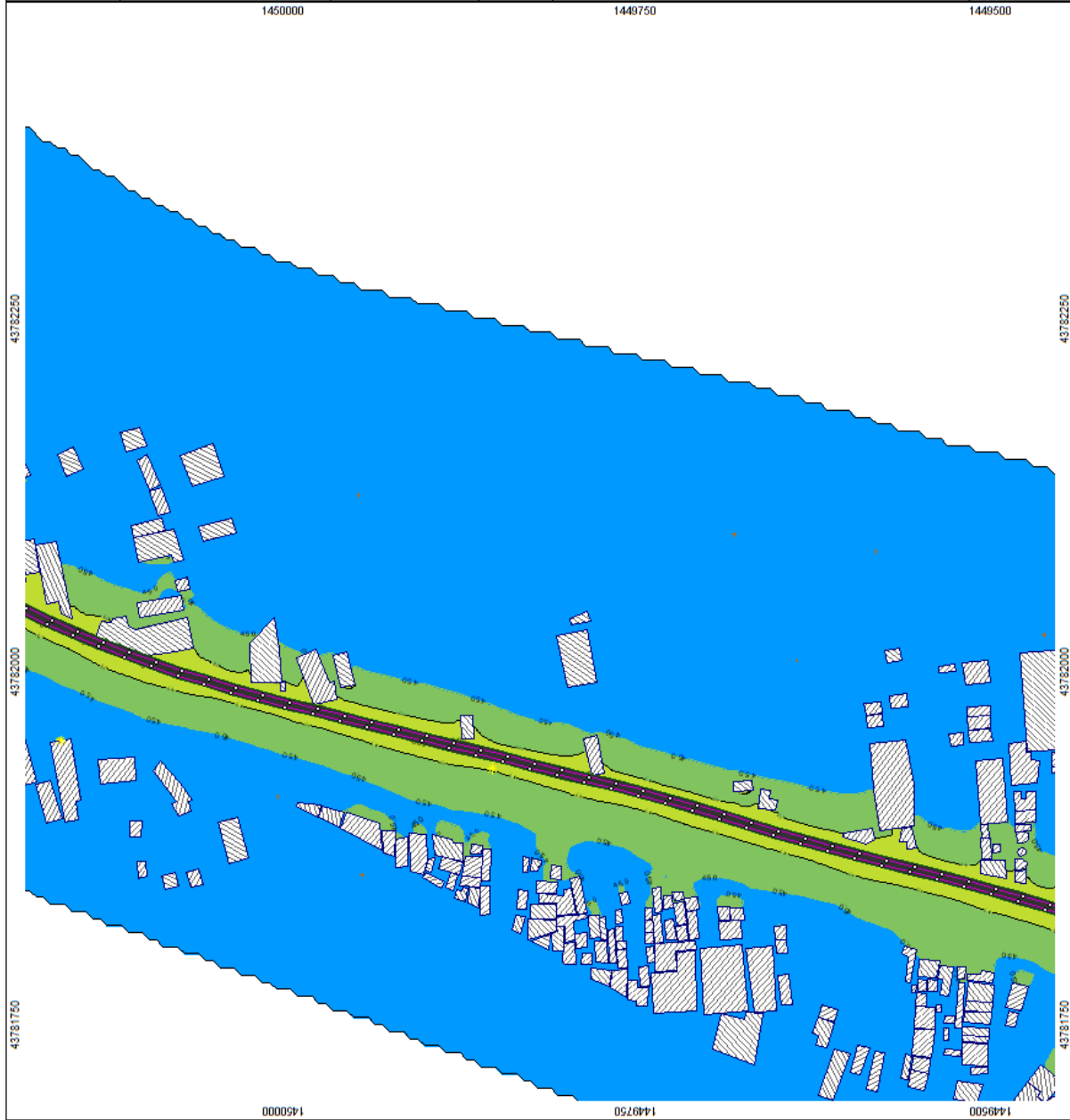


KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Contours from BVI SoundPLAN 8.1. Library and
BANCIL Building Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project engineer: CNR
Created: 31/10/20
Processed with SoundPLAN 8.1, Update 10/23/2018



**Levels Leq,d
in dB(A)**

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bottomeflake
- Noise calculation area

Length scale 1:2727



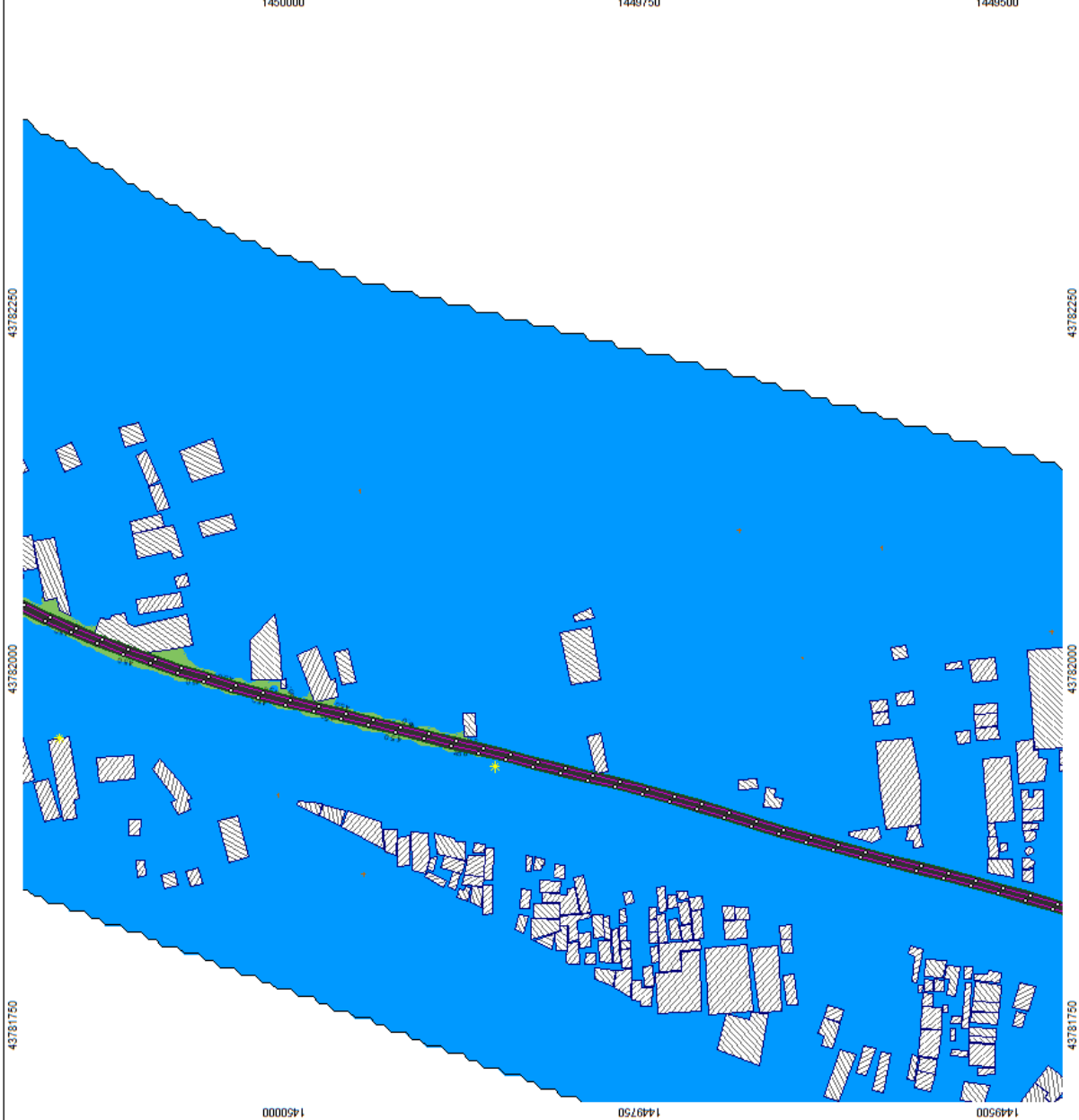
KR Puram to Kempgowda International Airport

Operational Noise:
 Street Map and Google Earth.
 Train noise power levels taken from EMU Soundplan 8.1 Library and
 BMIRCL Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
 Noise Contour Map
 Leq_n**
 Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update: 10/23/2018

- Levels Leq_n**
 in dB(A)
- < 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - >= 65
- Signs and symbols**
- Wall
 - Construction Equip
 - Main building
 - Point receiver
 - 3dB(A) increase from
 - Point Sources
 - Line source
 - Geometry blimp
 - Wall
 - Elevation point
 - Bodeneffekte
 - Noise reduction area



KR Puram to Kempgowda International Airport

Operations of Bus, Trains, Metro, and Goods Trucks, etc. are considered in the noise contour map. The noise contours are based on the noise levels from the proposed rail line and the existing road traffic. The noise contours are based on the noise levels from the proposed rail line and the existing road traffic.

120 2031 2b with Parapet Wall Noise Contour Map

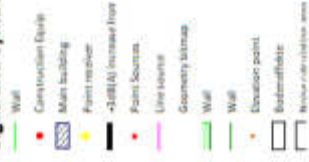
Calculation in 1.5 m above ground

Project engineer: DMH
 Revised: 19/10/2020
 Prepared with AutoCAD 2018 & 1. Update 10/20/2020

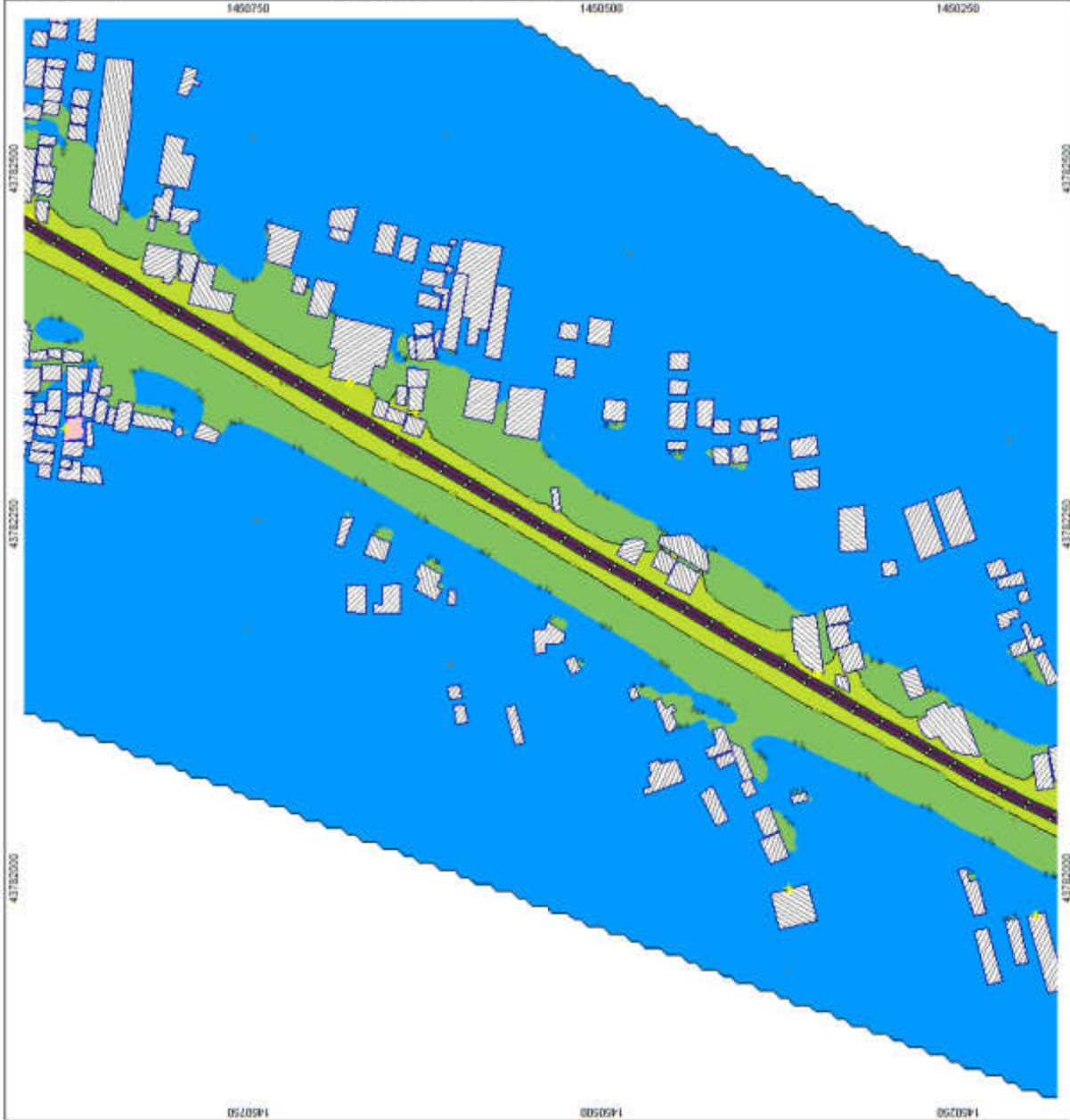
Levels Leq,d



Signs and symbols



Length scale 1:2727



KR Puram to Kempgowda International Airport

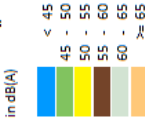
Operational Noise:
 Detailed Street Map and Google Earth
 Train noise power levels taken from EMU Soundplan 8.1 Library and
 BMRCL Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
 Noise Contour Map**

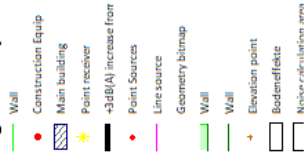
Leq,n
 Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update 10/23/2018

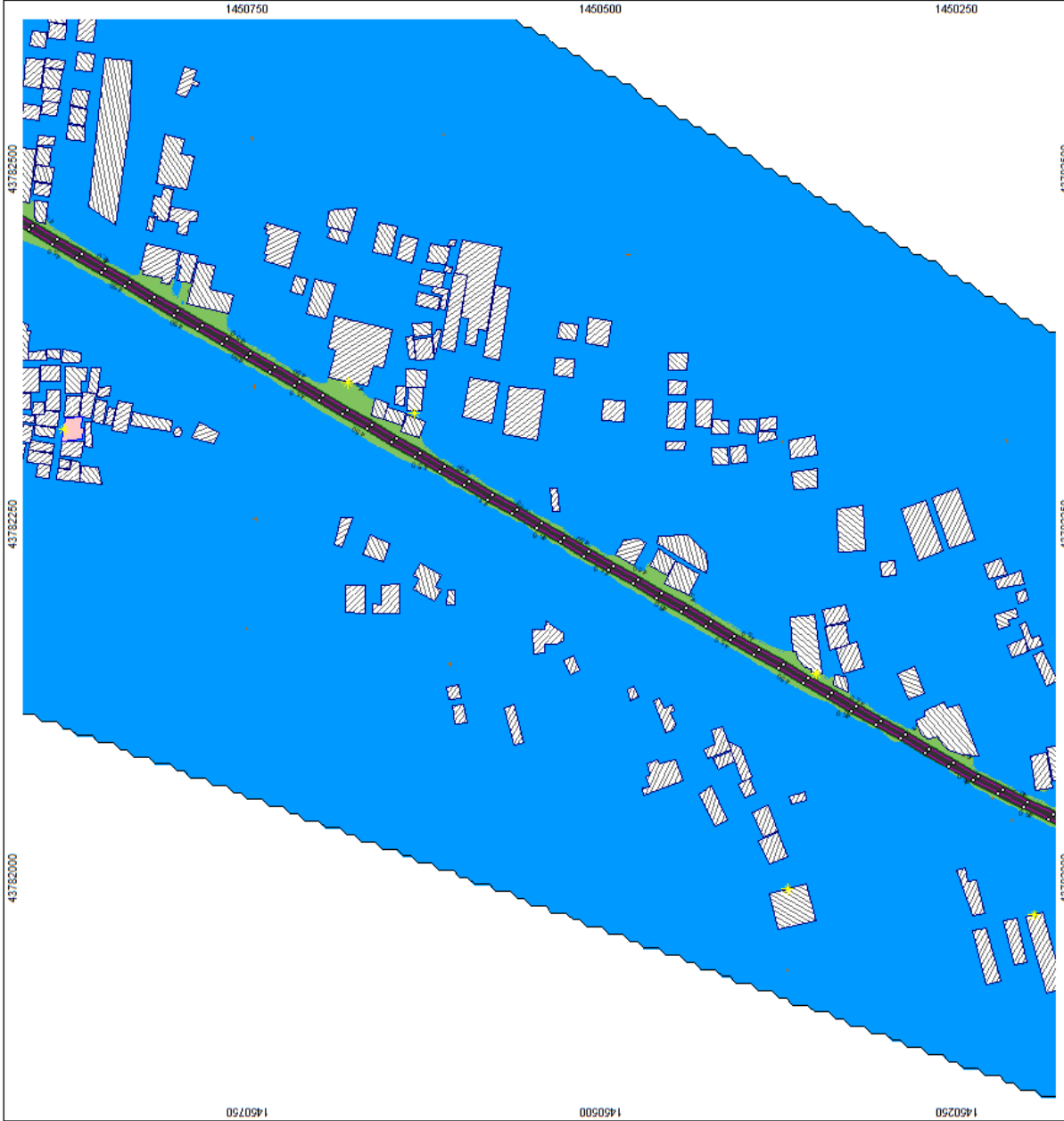
**Levels Leq,n
 in dB(A)**



Signs and symbols



Length scale 1:2727



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Map prepared with data from M/s SoundPLAN B.L. Gupta and
M/s O. Narayanaiah & Associates. Date: 15/01/2018

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

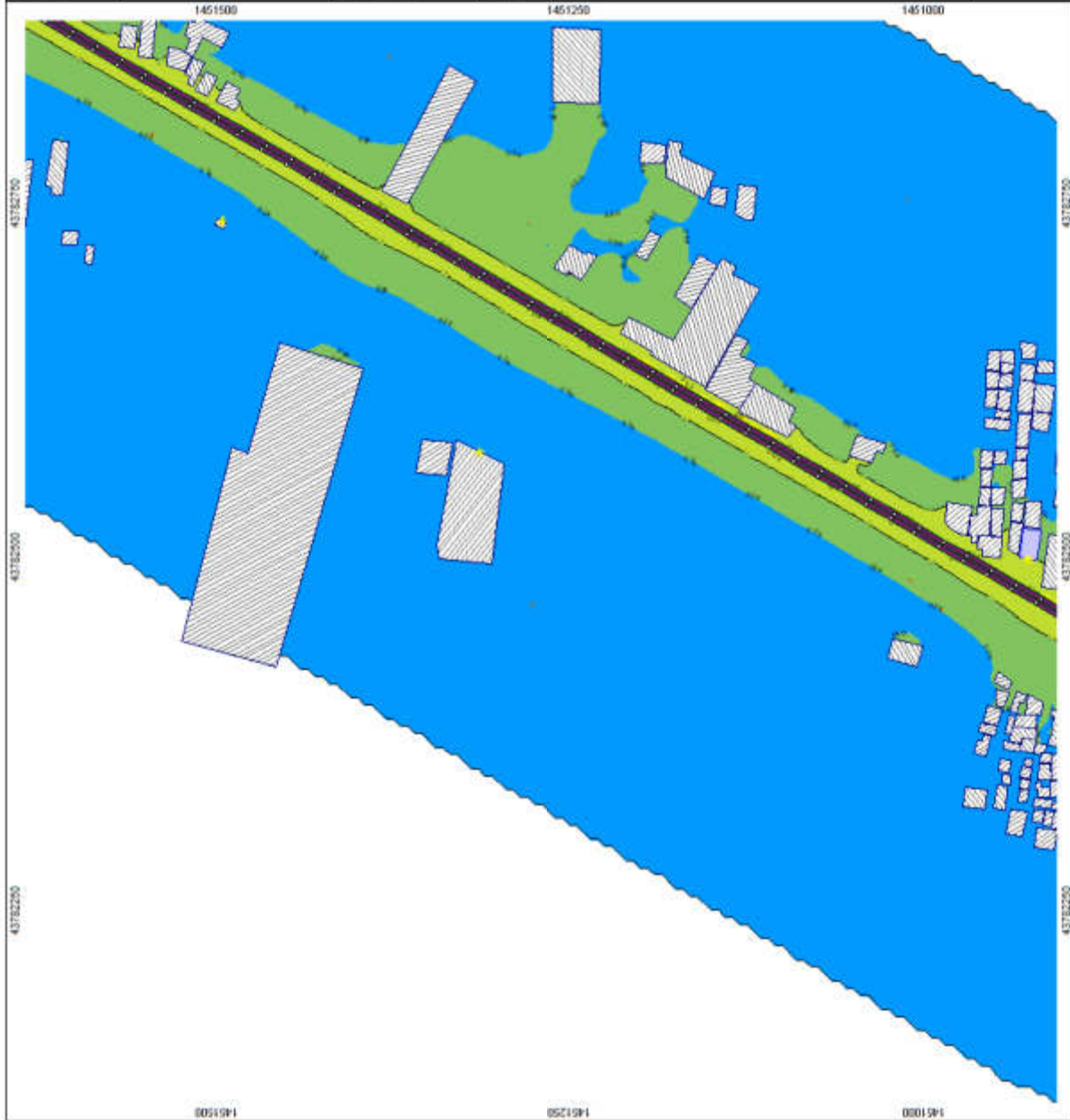
Project engineer: CMR
Created: 01/01/2018
Processed with SoundPLAN B.L. Gupta 10/01/2018

Levels Leq,d in dB(A)

- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +300(A) increase from
- Point Source
- Line source
- Geometry change
- Wall
- Elevation gain
- Build-offline
- Receiver elevation gain



KR Puram to Kempegowda International Airport

Operational Noise.
Buildings from Street Map and Google Earth.
Train noise power levels taken from BMU Soundplan 8.1 Library and
BIMTCL Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq_{1h}**
Calculation in 1.5 m above ground

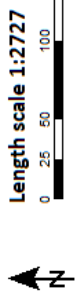
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq_{1h}
in dB(A)

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	>= 65

Signs and symbols

Red dot	Construction Equip
Blue hatched box	Main building
Yellow star	Point receiver
Black line	+3dB(A) increase from
Red dot	Point Sources
Black line	Line source
Green hatched box	Geometry bitmap
Green line	Wall
Green line	Wall
Green line	Elevation point
White box	Bodeneffekte
White box	Noise calculation area



KR Puram to Kempegowda International Airport

Operational Basis:
Buildings from Street Map and Google Earth.
Main structure from data from DMU Karnataka S.I. Library and
black & white data specification. Train station and
shops from Railway Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

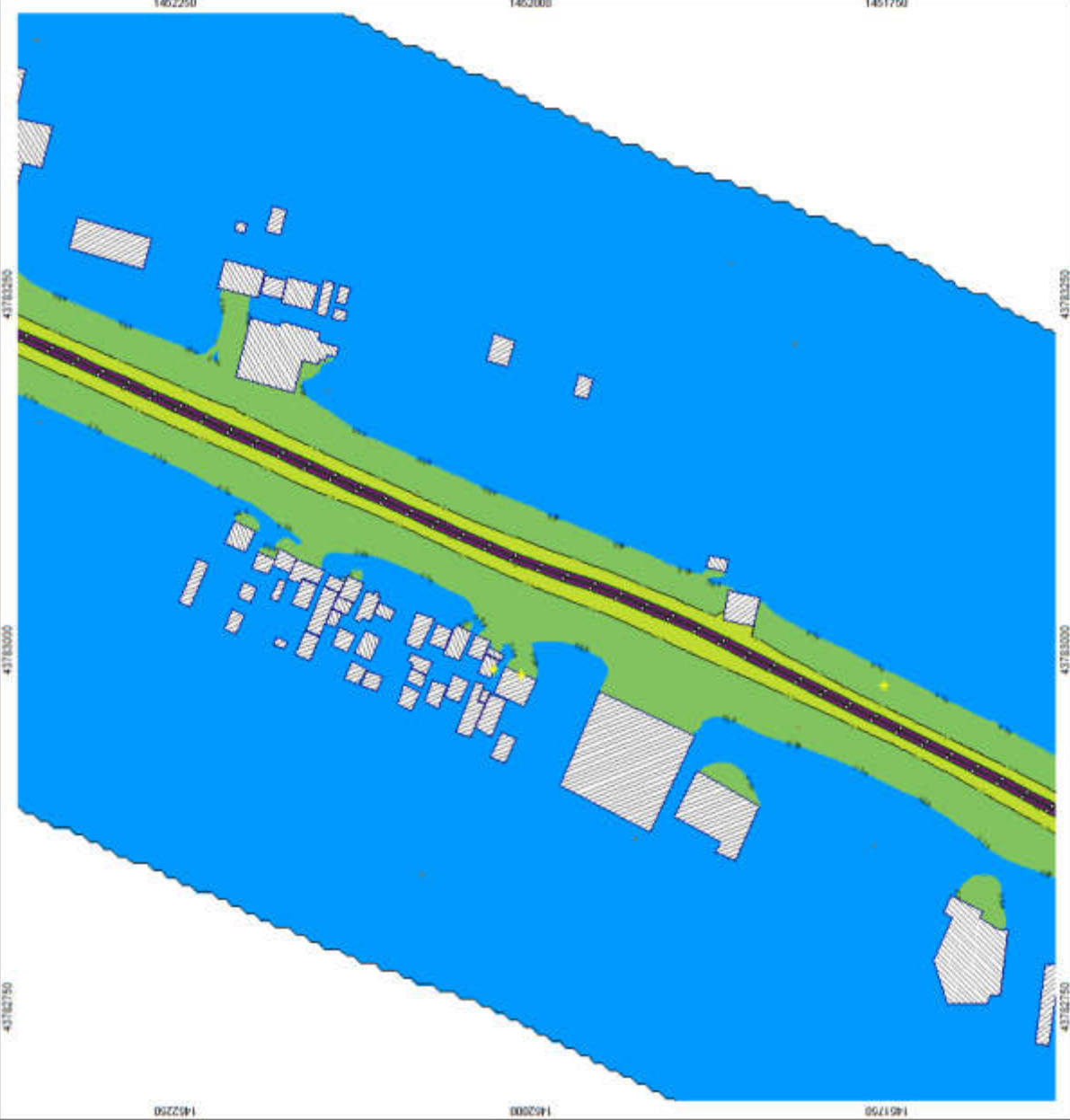
Project engineer: CMR
Contact: 9745020
Prepared with StreetPlan S.I. Update (07/17/2018)

Levels Leq,d
in dB(A)

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	>= 65

Signs and symbols

Red line	Wall
Green line	Construction Style
Blue hatched box	Main building
Yellow hatched box	Point marker
Black line	>3dB(A) increase/hour
Red dot	Point Source
Green dot	Line source
Green hatched box	Geometry border
Green line	Wall
Red dot	Deviation points
White box	Buildings/area
White box	Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Main building levels from BMU Soundplan 8.1 Library and
BANCIL Building Sound Classification. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,n
Calculation in 1.5 m above ground**

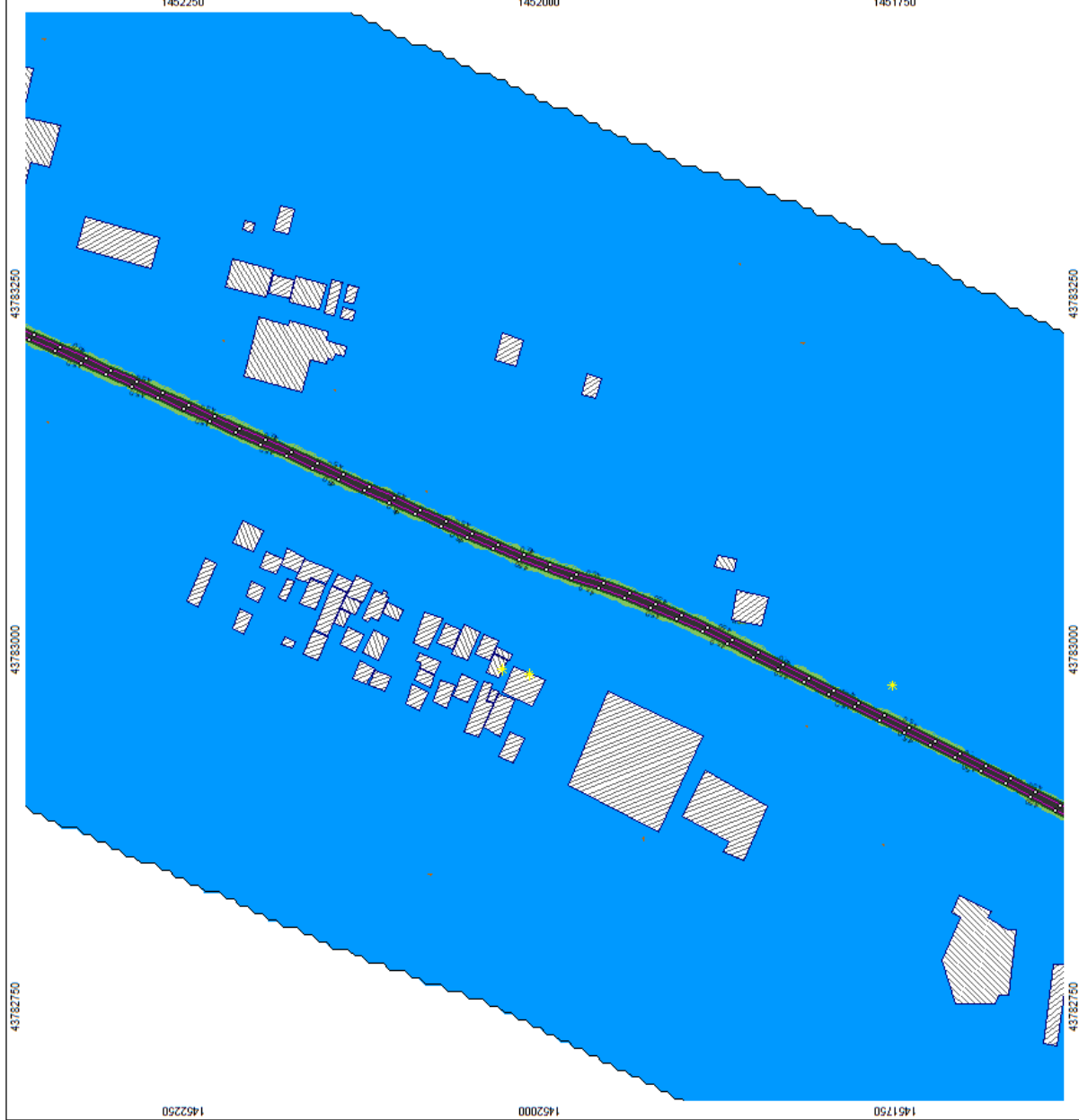
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
-3dB(A) increase from
Point Sources
Line source
Geometry bitmap
Wall
Wall
Elevation point
Bottomeflate
Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise
Buildings from Jones Map and Google Earth.
Noise contours are based on the noise contours from the ICAO Annex 14 Library and
BANC's Noise Contour Software. The contours are
derived from the following data:

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

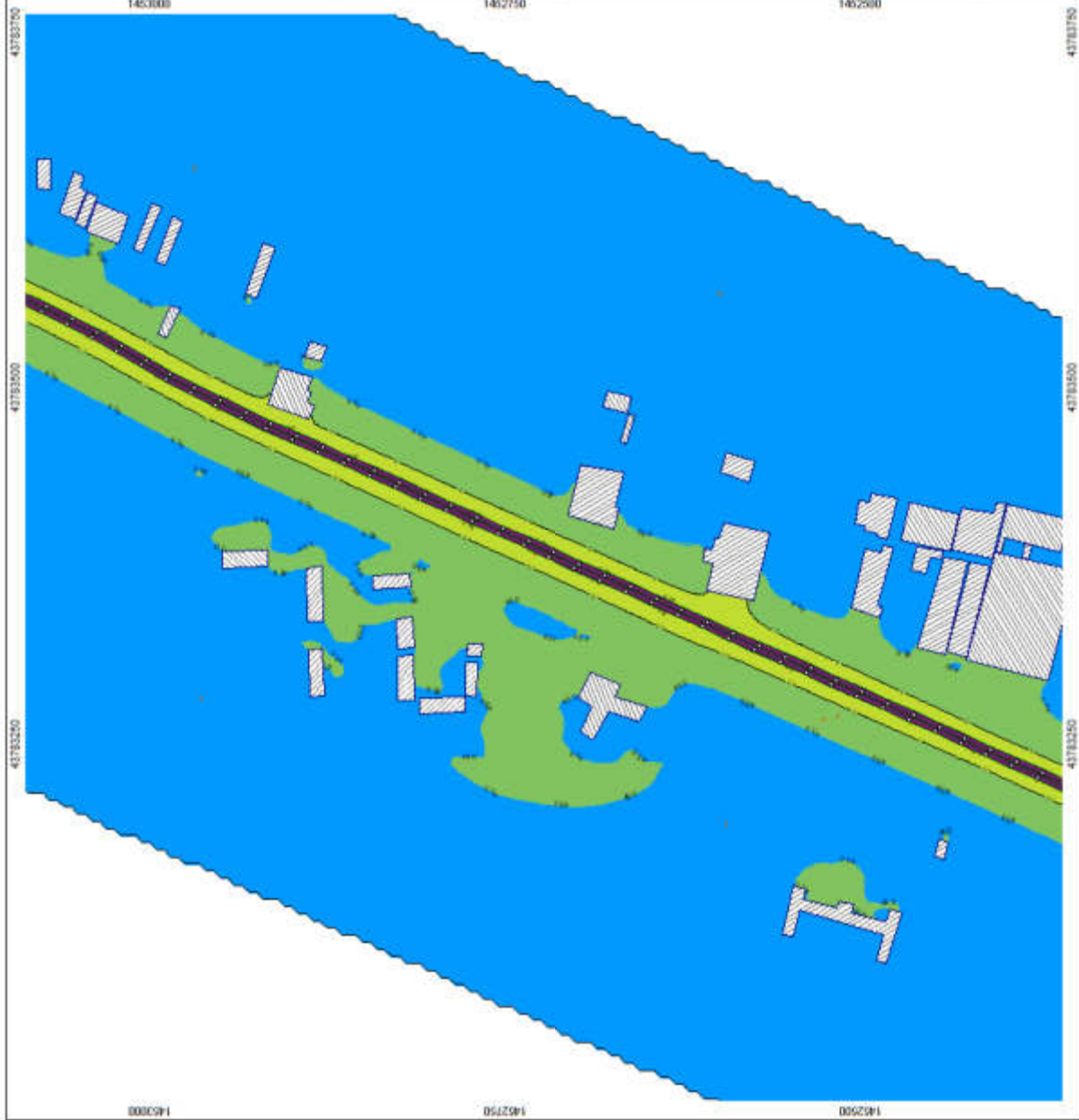
Project engineer: DMH
Client: KSI/02/20
Approved with SemaPWA & L Update 10/07/2018

Levels Leq,d
in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Construction Equip
Mud building
Point receiver
-1.0dB(A) increase from
Point Source
Line source
Geometry change
Wall
Wall
Elevation point
Substation
Minor substation area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise power levels taken from DMU Soundplan 8.1 Library and
BMRC Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

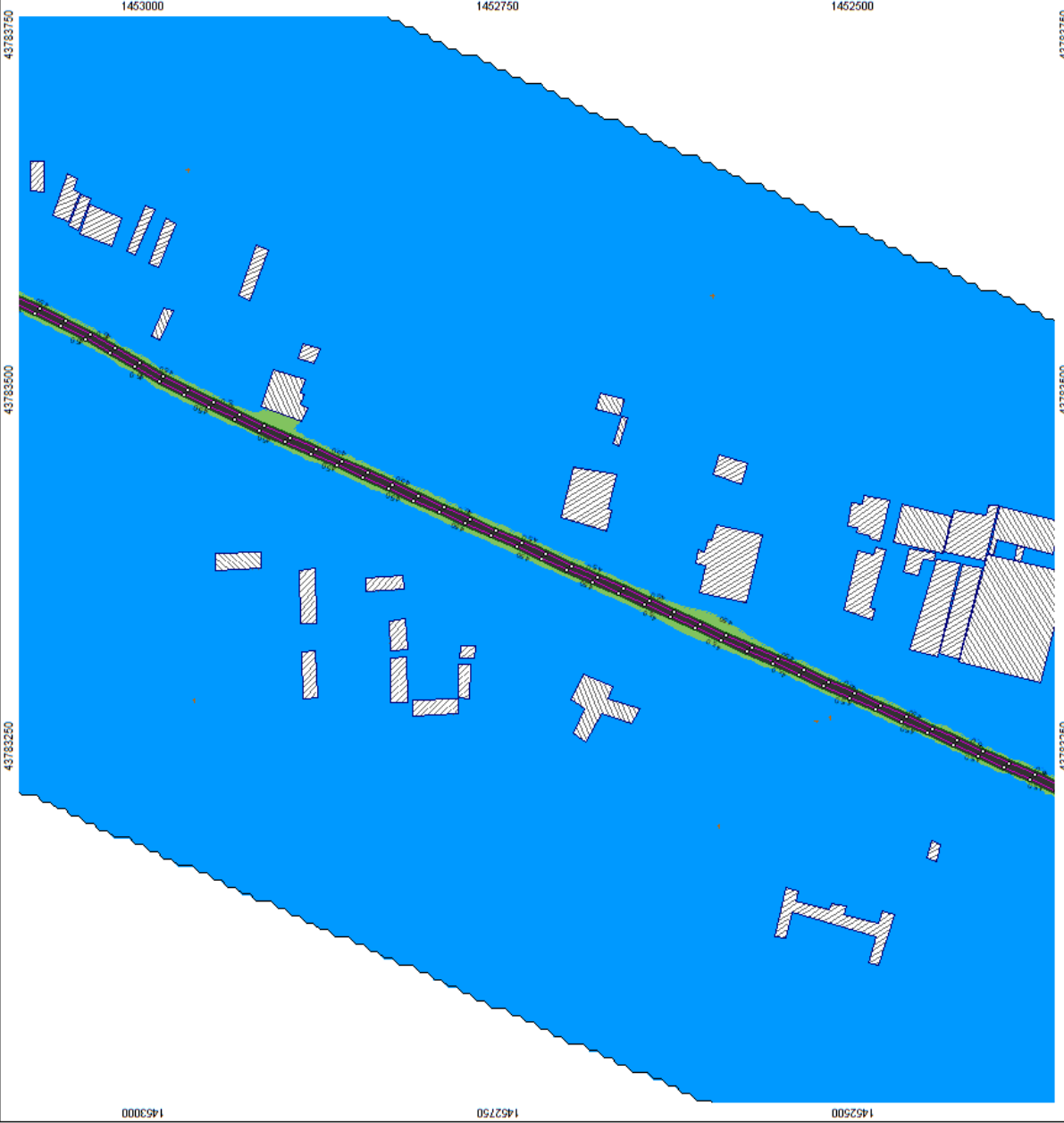
Project engineer: CMR
Created: 9/10/2020
Processed with SoundPLAN 8.1. Update 10/23/2018

Levels Leq,n
in dB(A)

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	>= 65

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodenreflekte
- Noise calculation area



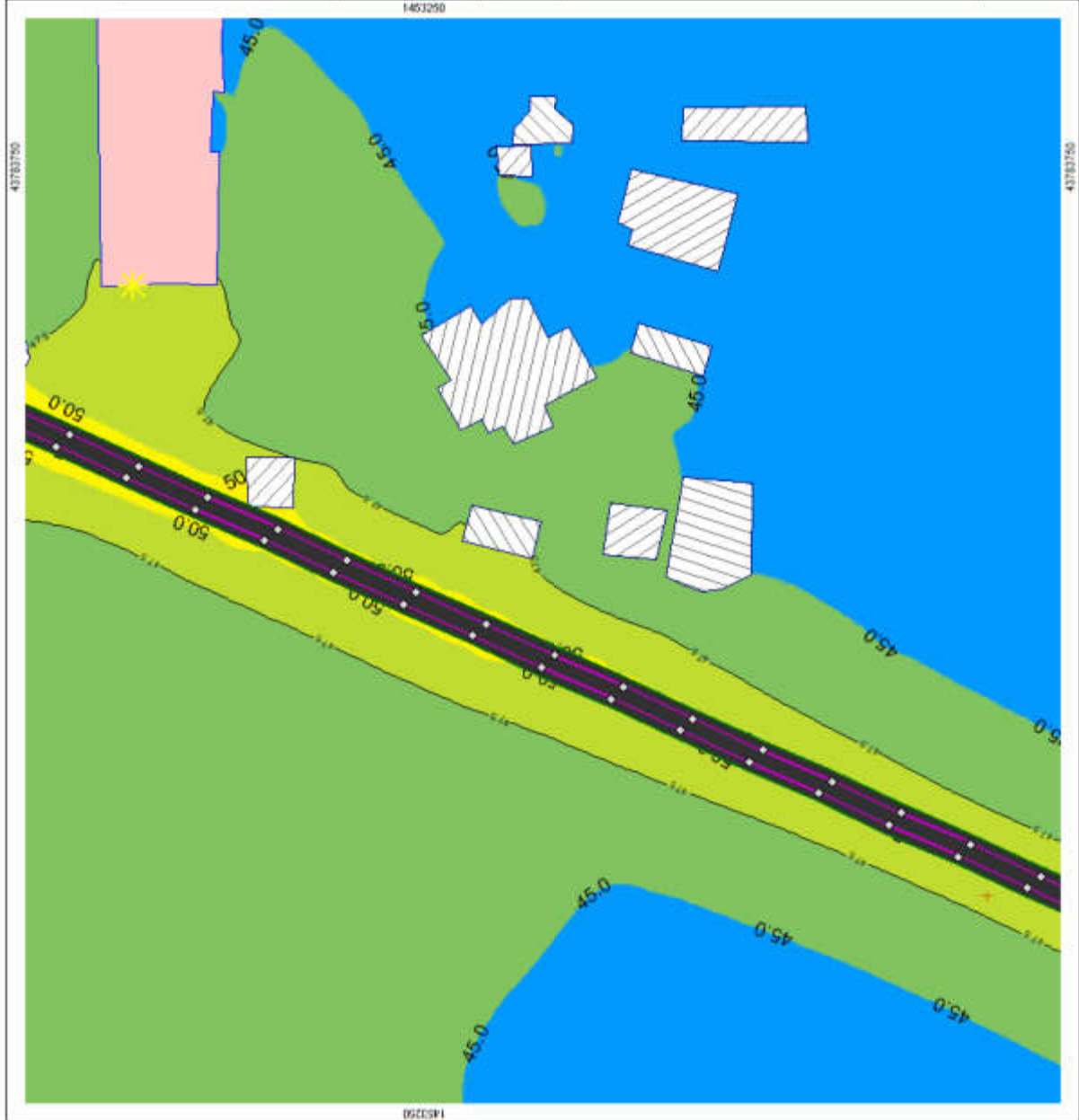
KR Puram to Kempegowda International Airport

Operational Modes:
 Buildings from Inner Map and Google Earth.
 The noise contours are based on the ICAO Annex 16, Volume 1, Chapter 8.1. Library and
 BIMD, Building Stock Specification. From vehicle and
 aircraft from feasibility study.

**120 2031 2b with Parapet Wall
 Noise Contour Map
 Leq,d**
 Calculation in 1.5 m above ground

Project engineer: CMR
 Control: S/16/09/20
 Prepared with SoundPLAN 8.1, Update 10/23/2018

- Levels Leq,d**
 in dB(A)
- < 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - >= 65
- Signs and symbols**
- Well
 - Construction Equip
 - Main building
 - Point number
 - +dB(A) increase flow
 - Point Sources
 - Line sources
 - Greenery strip
 - Wall
 - Direction points
 - Barbed wire
 - Noise abatement zone



KR Puram to Kempegowda International Airport

Operational Noise:
 Flight from Airport Map and Ground Earth
 Train map and ground Earth from BMU SoundPLAN 8.1 Library and
 BMBCI Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
 Noise Contour Map
 Leq,n**
 Calculation in 1.5 m above ground

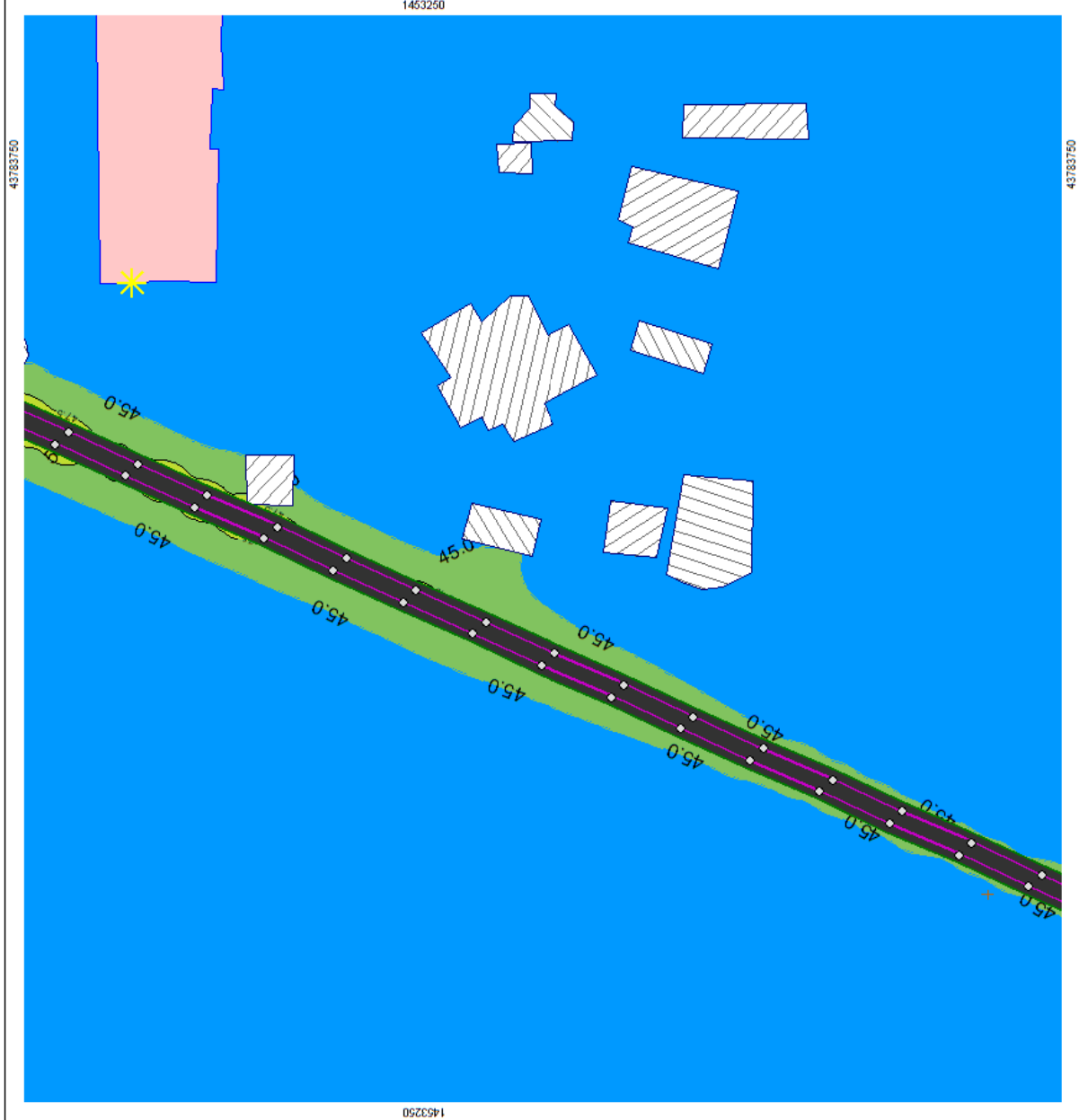
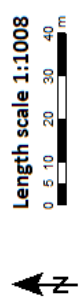
Project engineer: GMR
 Contact: 9/11/2020
 Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,n
 in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
≥ 65

Signs and symbols

Wall	Construction Equip
Main building	Main building
Point receiver	Point receiver
+3dB(A) increase from	+3dB(A) increase from
Point Sources	Point Sources
Line source	Line source
Geometry blimp	Geometry blimp
Wall	Wall
Wall	Wall
Elevation point	Elevation point
Bodenreflekt	Bodenreflekt
Mischer-erleuchtungs area	Mischer-erleuchtungs area



KR Puram to Kempegowda International Airport

Operational Noise:
 Derived from Direct Map and Sample Earth
 Topography from Digital Map from OMS, SoundPLAN 8.1.1 Library and
 (MBC) Building Stock Specifications. Terrain schedule and
 aspects from Feasibility Study.

**120 2031 2b with Parapet Wall
 Noise Contour Map
 Leq,d**

Calculation in 1.5 m above ground

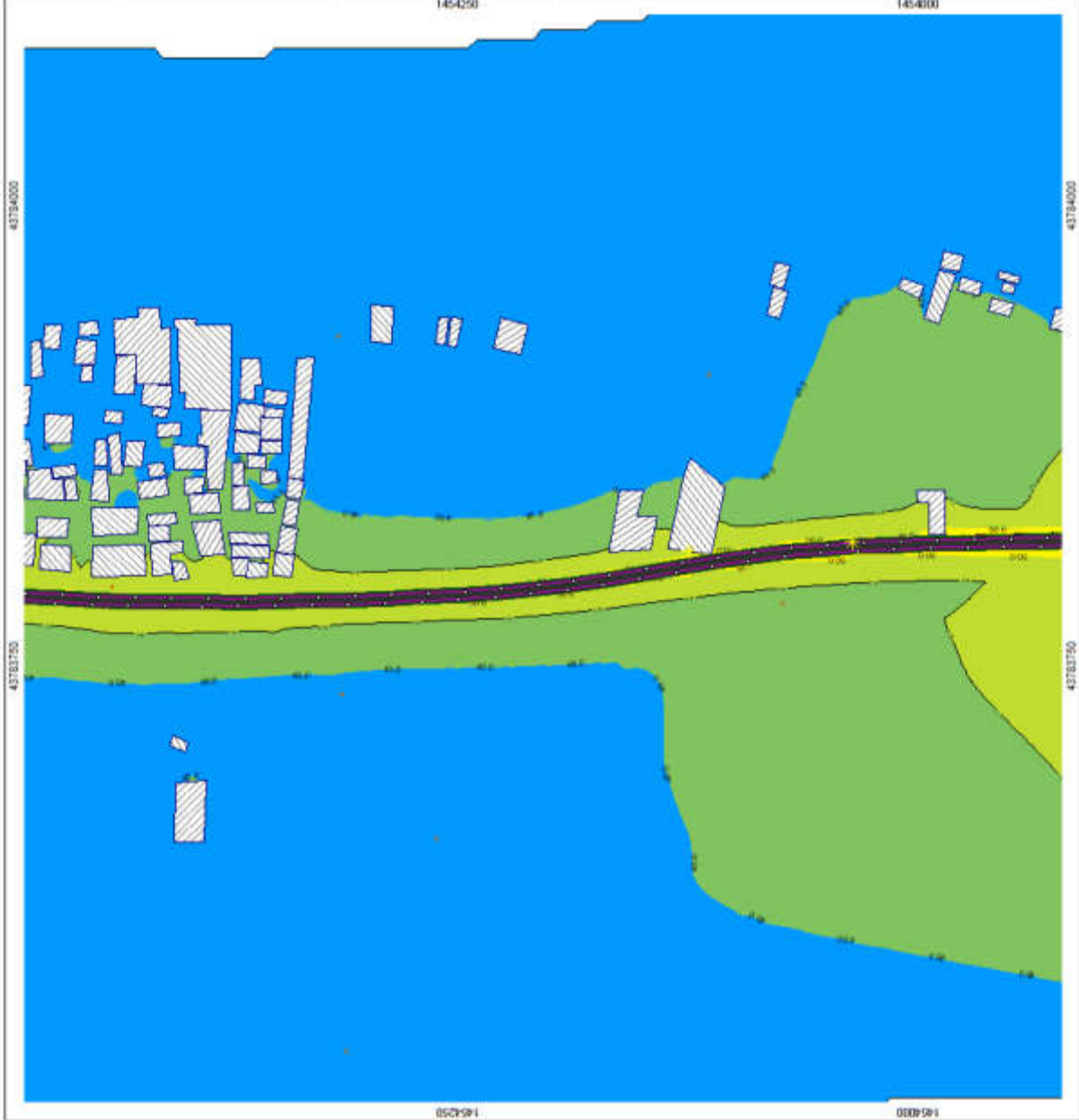
Project engineer: CMR
 Contact: 0110100100
 Processed with SoundPLAN 8.1.1, Update 10.01.0218

Levels Leq,d
 in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Construction Equip
Main building
Point receiver
-dBA(d) increase from
Point Sources
Line source
Geometry obstacle
Wall
Elevation point
Subsoil data
Receiver calculation area



43734000

43733750

1454250

1454100

43734000

43733750

050191

000191

KR Puram to Kempegowda International Airport

Operational Noise
 Buildings from Street Map and Google Earth
 Train tracks from EMU Soundplan 8.1 Library and
 BMRC Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2031.2b with Parapet Wall
 Noise Contour Map
 Leq,1n**
 Calculation in 1.5 m above ground

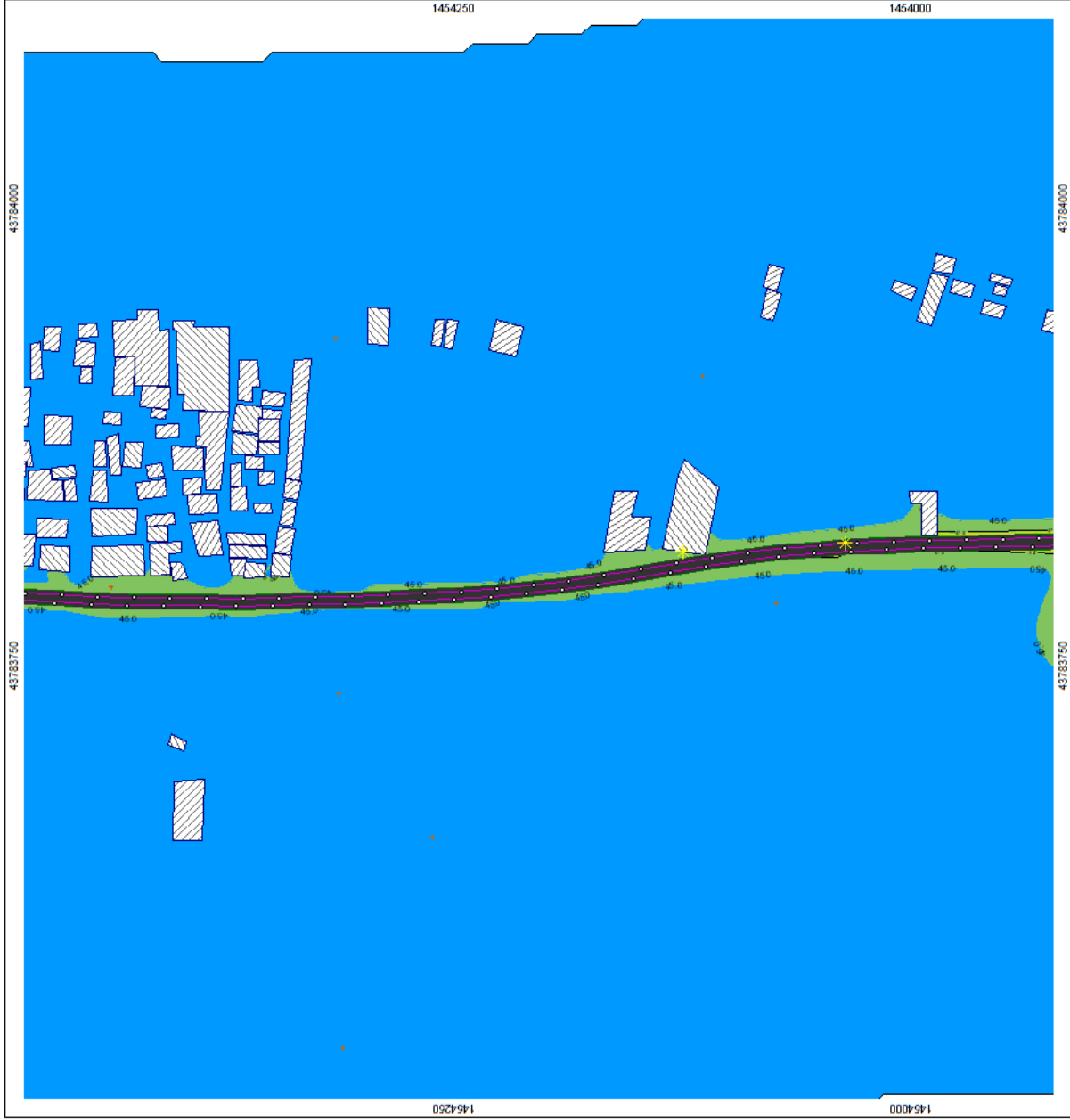
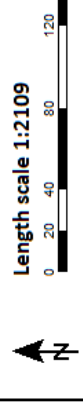
Project engineer: CMR
 Created: 9/10/2020
 Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,1n
 in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
+3dB(A) increase from
Point Sources
Line source
Geometry bitmap
Wall
Wall
Elevation point
Bodeneffekte
Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise:
 Building from Street Map and Google Earth.
 From noise power level taken from DNO Spreadsheet 8.1. Library and
 aircraft taking bank specifications. Train schedule and
 speeds from feasibility study.

**120 2031 2b with Parapet Wall
 Noise Contour Map
 Leq,d**

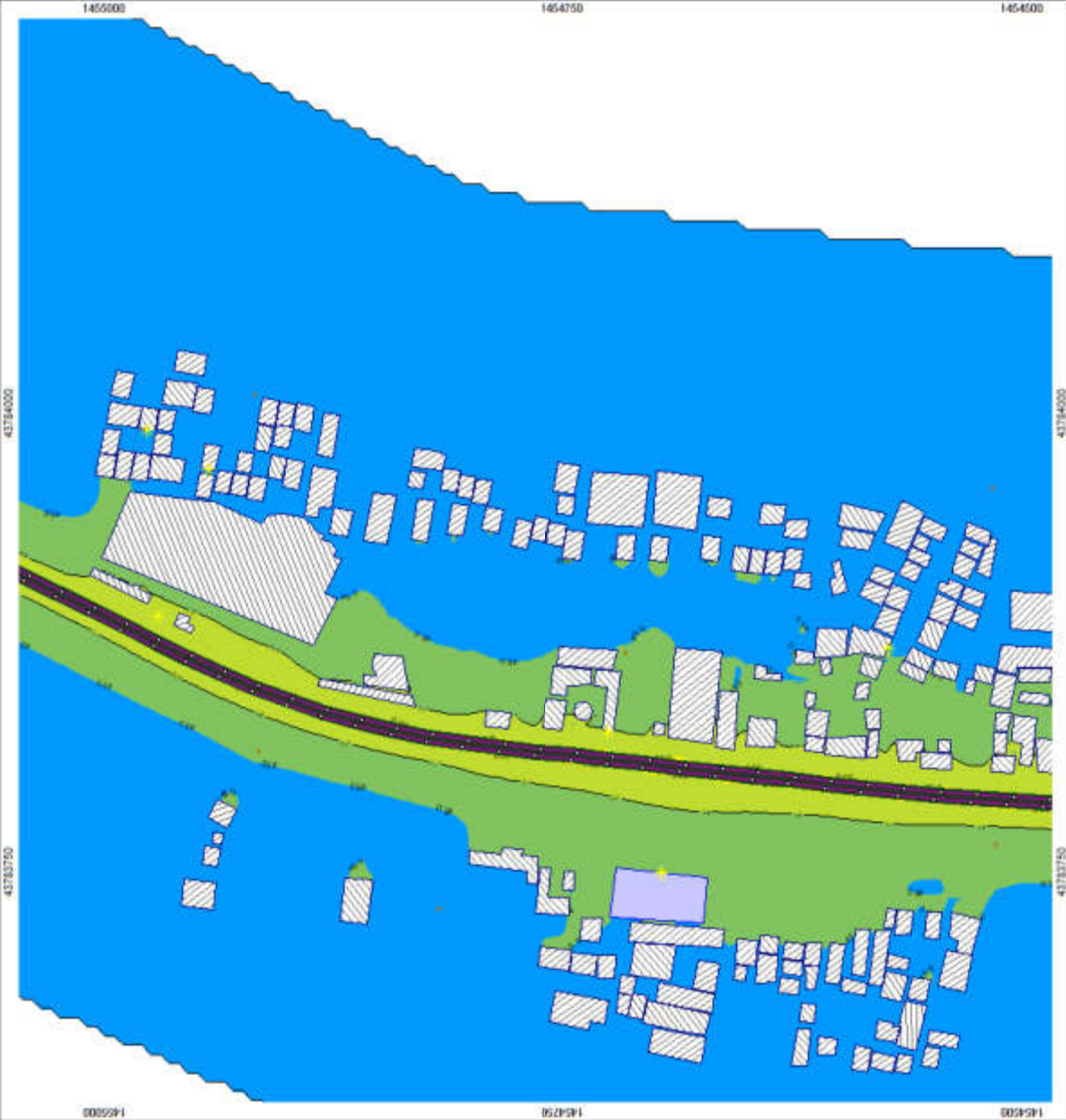
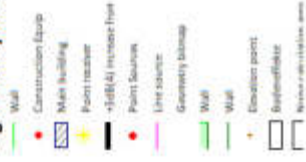
Calculation in 1.5 m above ground

Project engineer: OMB
 Created: 9/11/2020
 Produced with SoundPLAN 8.1, Update 10/23/2018

**Levels Leq,d
 in dB(A)**



Signs and symbols



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Receiver levels taken from BMU Soundplan 8.1 Library and
BANC. Building facing and location. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,n
Calculation in 1.5 m above ground**

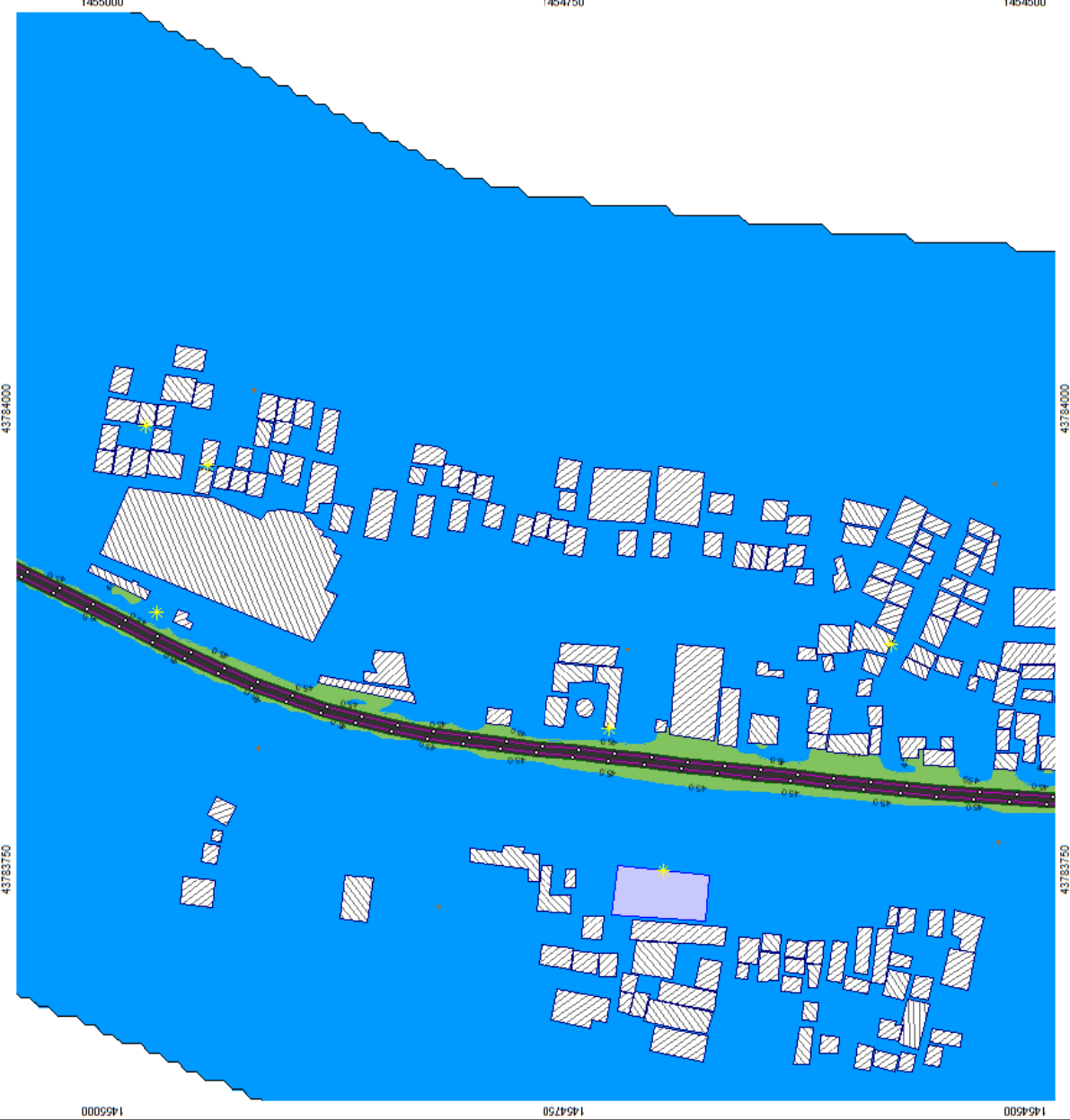
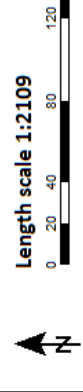
Project engineer: CMR
Created: 9/11/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Construction Equip
Main building
Point receiver
-3dB(A) increase from
Point Sources
Line source
Geometry bmap
Wall
Elevation point
Bodeneffekte
Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Topography from SRTM30 PLUS and SoundPLAN 8.1. Library and
BARRCL Best-Stack-Source-Emission. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq, n**
Calculation in 1.5 m above ground

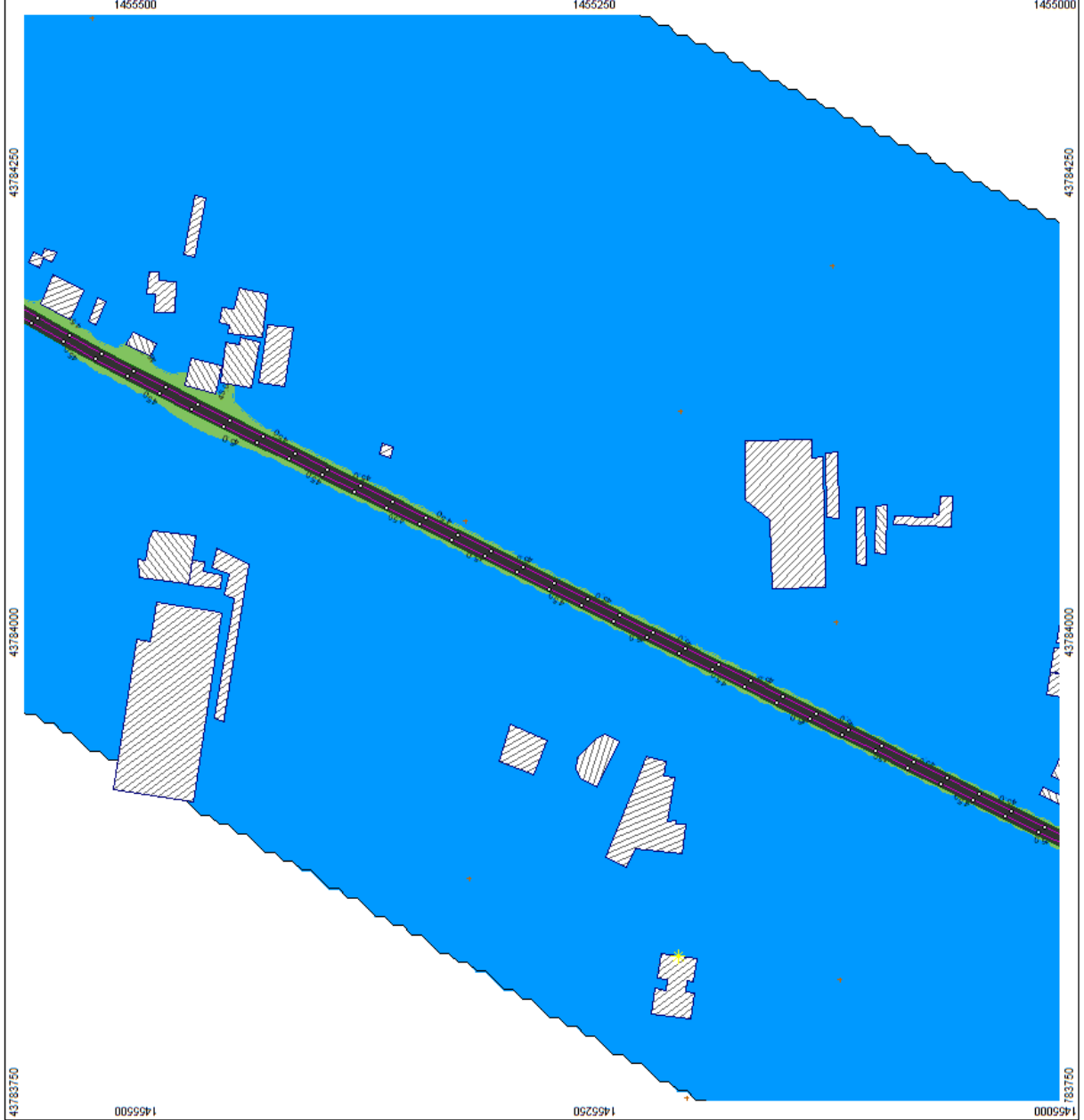
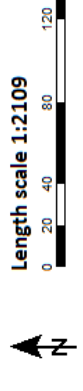
Project engineer: CMR
Created: 9/11/2020
Processor with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n
in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodenreflekt
- Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise
 Multiple Source Map and Sound Levels
 Train noise levels taken from DMU Soundpower & L1 Library and
 BMBC Building Stock Specification. Train schedule and
 speeds from feasibility study.

**120 2031 2b with Parapet Wall
 Noise Contour Map
 Leq,d**

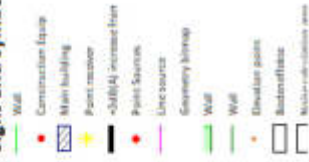
Calculation in 1.5 m above ground

Project Engineer: CMR
 Client: B.L.L.2010
 Prepared with SoundPLAN 8.1.1, Update 16/07/2018

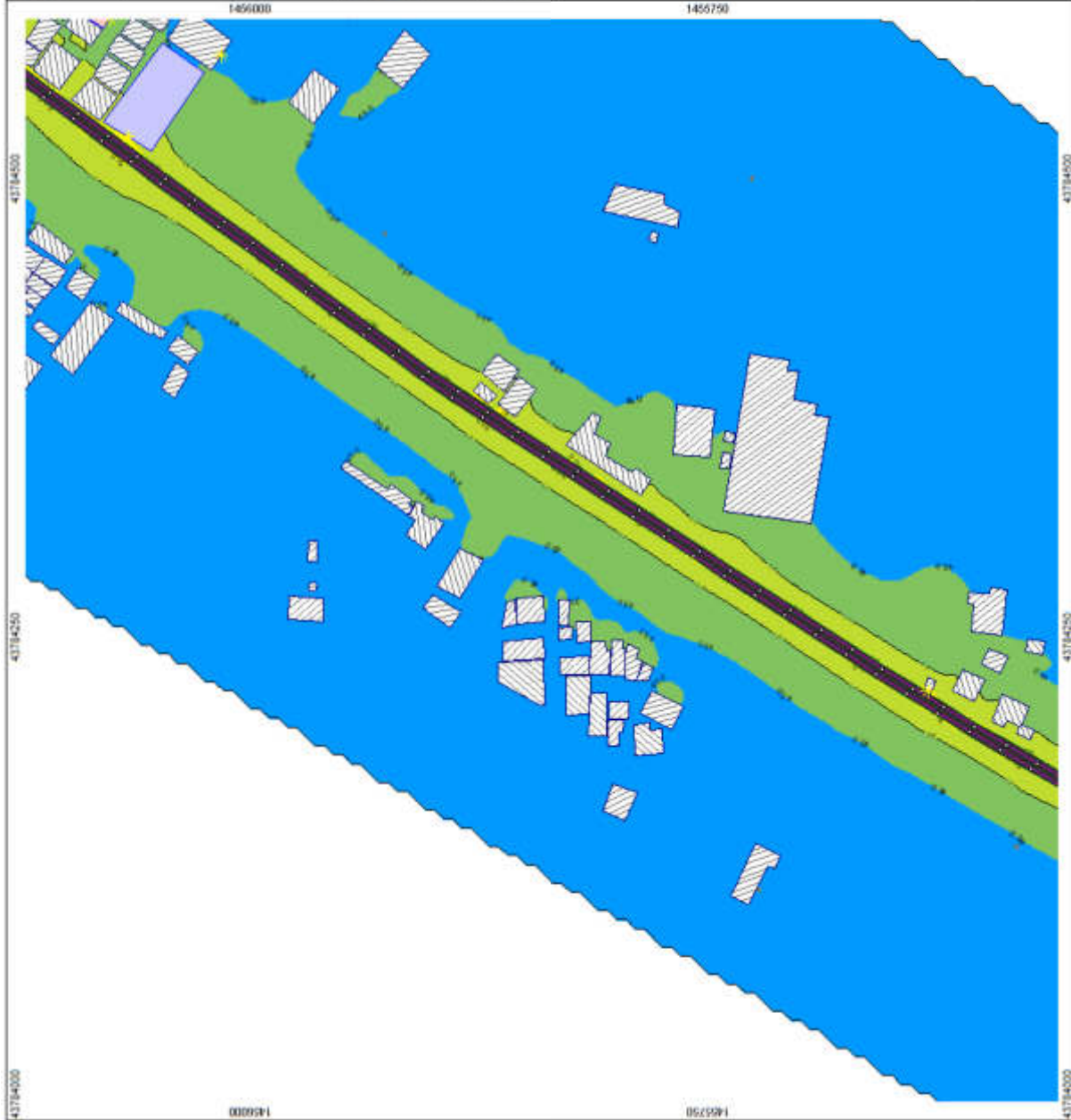
**Levels Leq,d
 in dB(A)**



Signs and symbols



Length scale 1:2109



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Topography from SRTM 30m, ENU SoundPLAN 8.1 Library and
BMBCL Building Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

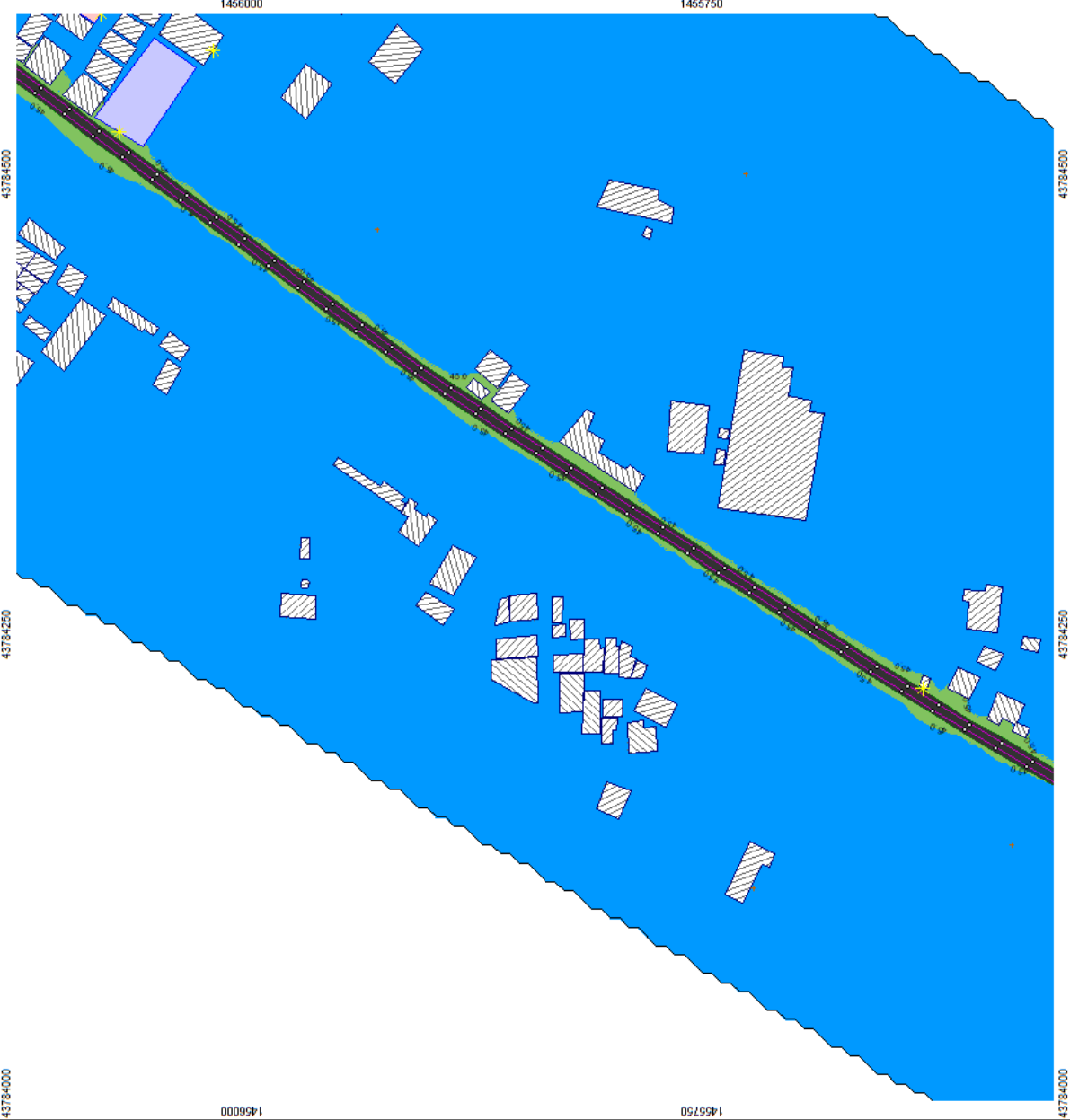
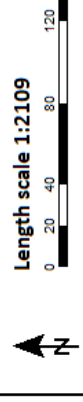
Project engineer: OMR
Created by: BGS
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n
in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
≥ 65

Signs and symbols

Wall	Construction Equip
Main building	Point receiver
+3dB(A) increase from	Point Sources
Line source	Geometry blimping
Wall	Wall
Elevation point	Bodenreflekte
Noise calculation area	



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
From noise power levels taken from ICAO Annex 16, 1. Library and
subject being back-specified, then standardized
levels from the study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

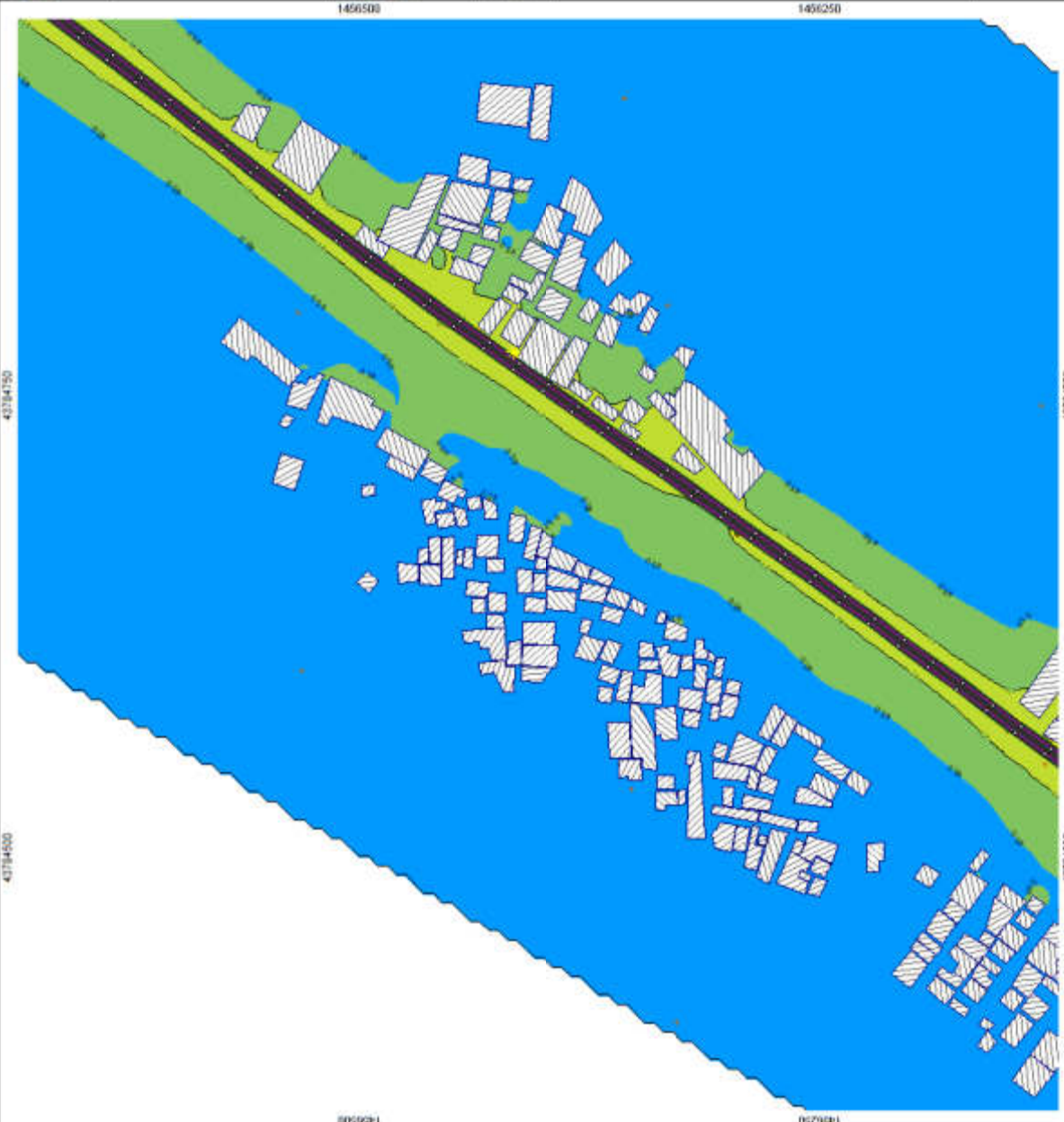
Project engineer: CMH
Consent: 16/11/2010
Revised with soundPact 8.1, Update: 16/03/2018

Levels Leq,d
in dB(A)

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	>= 65

Signs and symbols

Green line	Construction Equip
Red line	Wall
Blue hatched	Main building
Yellow hatched	Point receiver
Black line	+5dB(A) increase from
Red dot	Point sources
Purple line	Line sources
Green hatched	Geometry change
Green line	Wall
Red dot	Elevation point
Black outline	Background
Black outline	Not to scale reference area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Train noise-power levels taken from DMU Soundplan 8.1 Library and
BMRCL Rolling Stock Specification. Train schedule and
speeds from feasibility study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

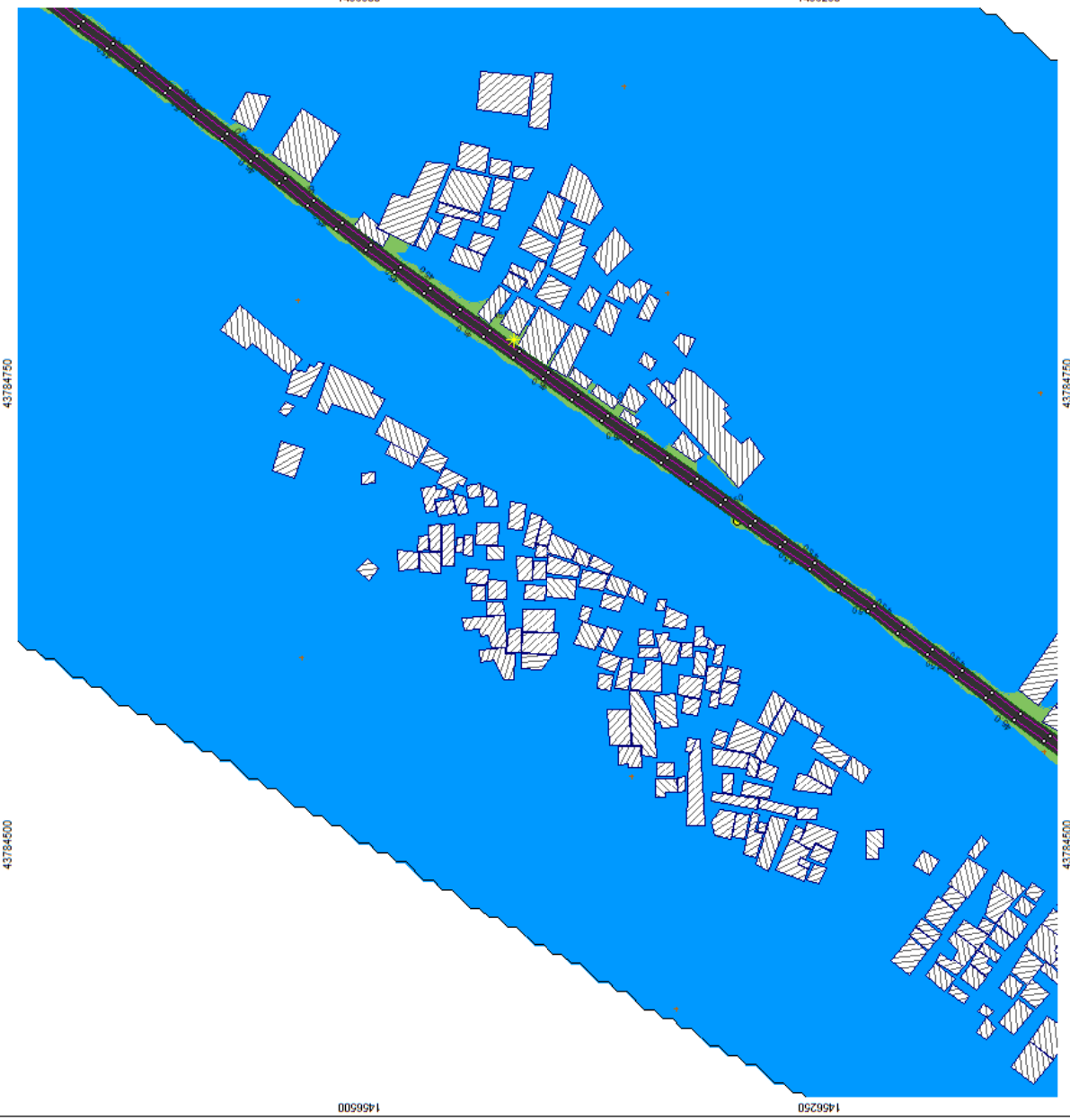
Project engineer: CMR
Created: 9/11/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n
in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Construction Equip
Main building
Point receiver
+3dB(A) increase from
Point Sources
Line source
Geometry blimap
Wall
Wall
Elevation point
Bodenreflekte
Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Soest Map and Google Earth.
True noise power levels taken from DMU, Soundbox & Library and
BANC, during track specifications, train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**

Calculation in 1.5 m above ground

Project engineer: CMR
Created: 3/11/2020
Proposed with SoundPLAN 8.1, Update: 10/31/2018

Levels Leq,d
in dB(A)

Blue	< 45
Light Blue	45 - 50
Yellow	50 - 55
Orange	55 - 60
Red	60 - 65
Dark Red	≥ 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry linesup
- Wall
- Wall
- Elevation point
- Receiver
- Noise contour lines



KR Puram to Kempegowda International Airport

Operational Noise
Buildings from Street Map and Google Earth.
Rain noise power level taken from DMU Soundplan 8.1 Library and
BEMCO Hearing Stock Specifications. Train schedule and
Journals from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**

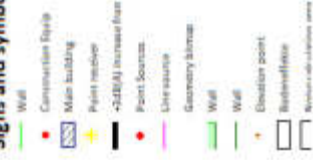
Calculation in 1.5 m above ground

Project engineer: OMR
Created: 9/11/2016
Processed with SoundPLAN 8.1, Update 10/27/2018

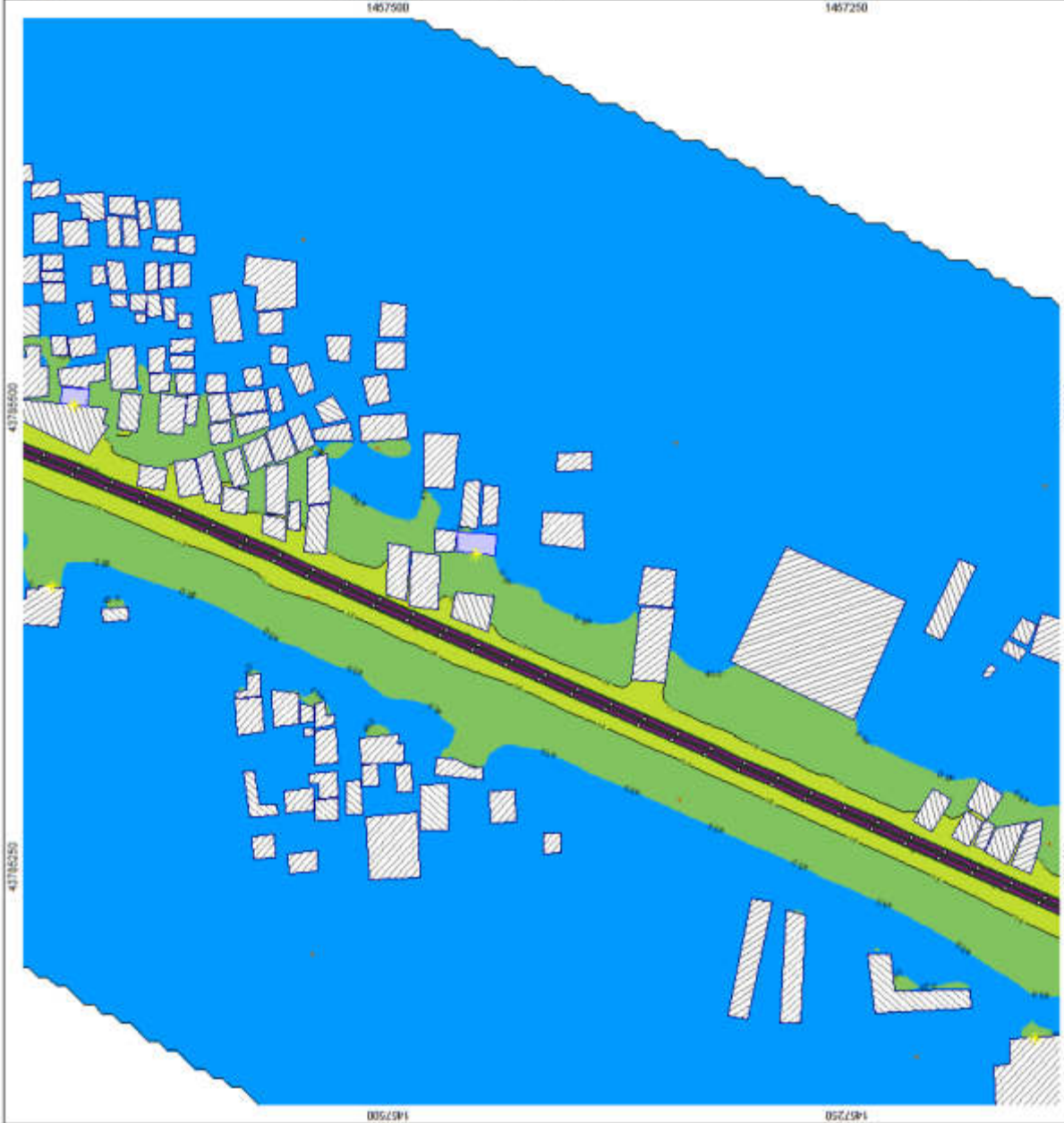
Levels Leq,d



Signs and symbols



Length scale 1:2109



KR Puram to Kempgowda International Airport

Operational Noise.
Buildings from Street Map and Google Earth.
Train noise power levels taken from EMU Soundplan 8.1. Library and BIRCEL Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

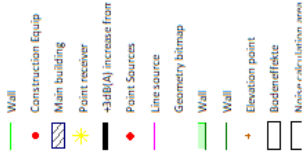
120 2031 2b with Parapet Wall
Noise Contour Map
Leq_n
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/11/2020
Processed with SoundPLAN 8.1. Update 10/23/2018

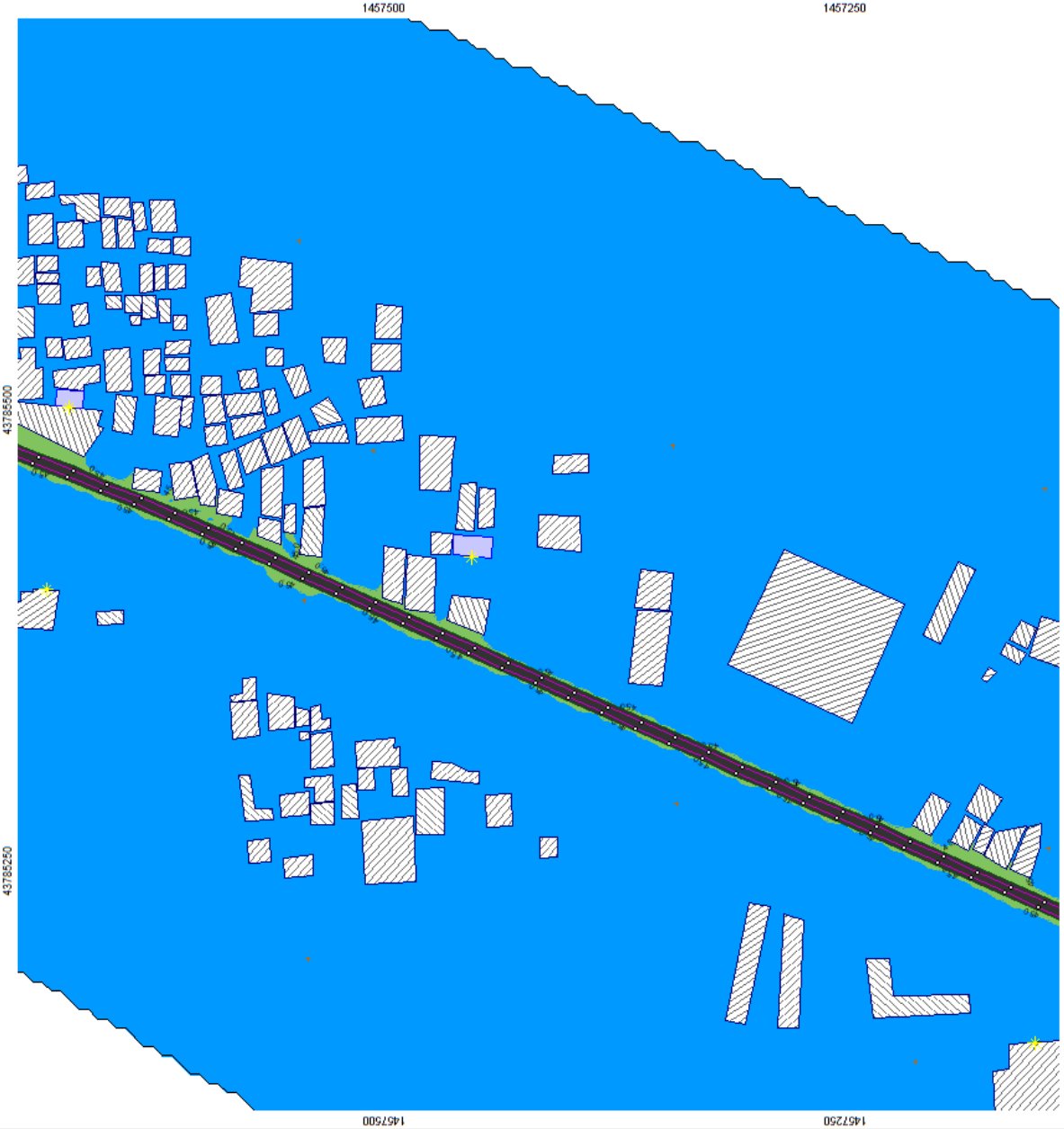
Levels Leq_n
in dB(A)



Signs and symbols



Length scale 1:2109



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Ground level from Survey of India, Bangalore & I. Library and
WAPSI, Building, Street, Location, Train, Vehicle and
Speed from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**

Calculation in 1.5 m above ground

Project engineer: CNR
Created: 01/11/2010
Processed with: soundPLAN 8.1.1, Update: 10/21/2018

Levels Leq,d in (dB(A))

- ≤ 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- ≥ 65

Signs and symbols

- Wall
- Combustion Equip
- Main building
- Point receiver
- +3dB(A) increase bar
- Point Source
- Line source
- Geometry barrier
- Wall
- Elevation point
- Receiver
- Receiver elevation area



KR Puram to Kempegowda International Airport

Operational Noise:
 High from the West Map and Google Earth.
 Train noise from the station from BMU Soundplan 8.1 Library and
 BMRL Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
 Noise Contour Map**

Leq,n
 Calculation in 1.5 m above ground

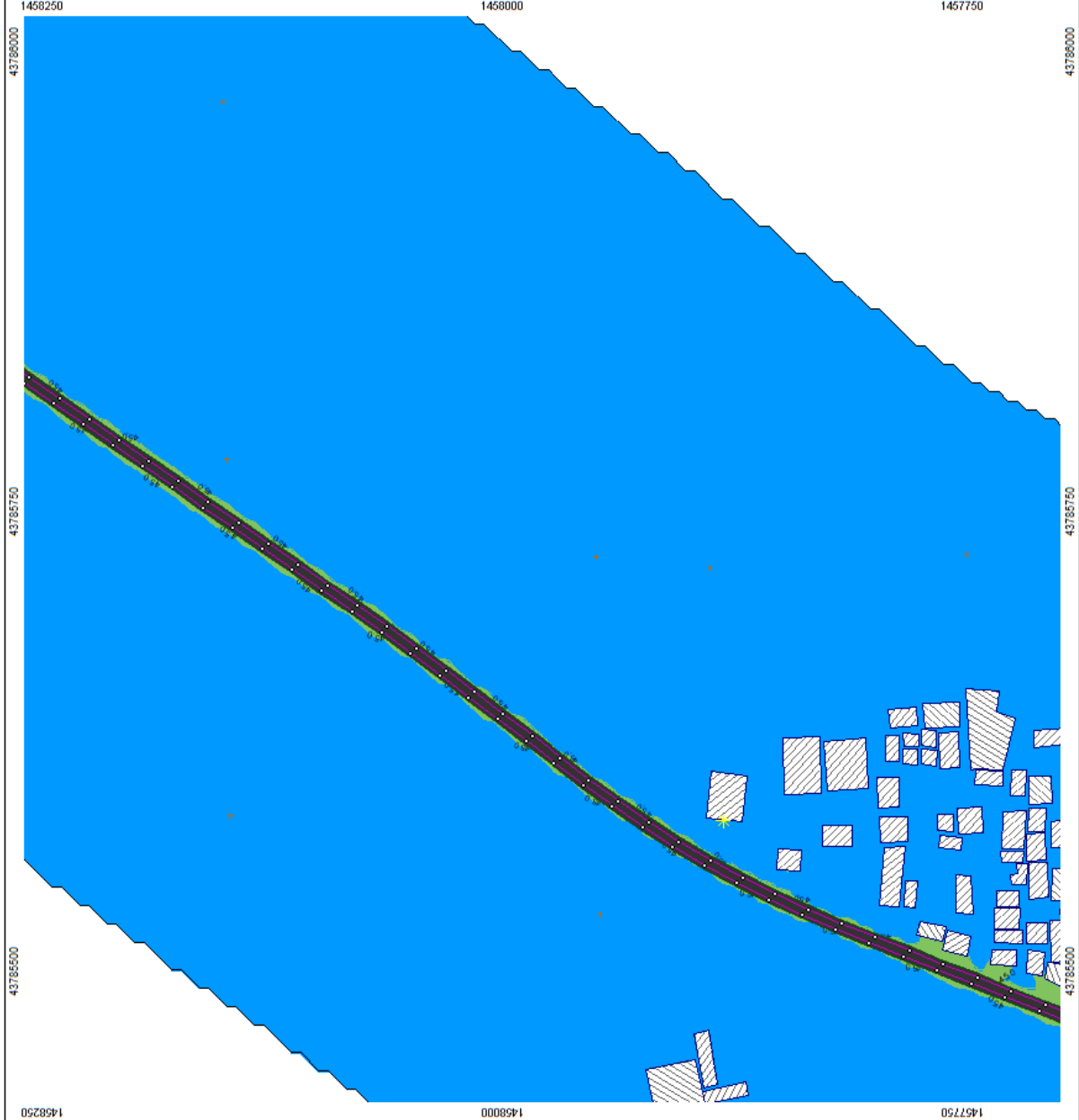
Project engineer: CMR
 Created: 9/11/2020
 Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n
 in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall	Construction Equip
Main building	Point receiver
+3dB(A) increase floor	Point Sources
Line source	Geometry blimp
Wall	Wall
Elevation point	Bodentafel
Not in calculation area	



KR Puram to Kempegowda International Airport

Operational Noise:
 Building from Street Map and Google Earth.
 Noise contours are based on the noise data from the
 MADCS, Building Stock Classification, Train schedule and
 speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
 Noise Contour Map
 Leq,d**
 Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 01/11/2020
 Procedure with revision: 149, 151, Update: 10/21/2018

Levels Leq,d
 in dB(A)

≤ 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Construction Eye
Main building
Point receiver
+3dB(A) increase from
Point Source
Line source
Geometry linkage
Wall
Elevation point
Bottom surface
Receiver elevation area



KR Puram to Kempgowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Noise contours from 120 2031 2b with Parapet Wall
with 1.5 m above ground. Calculated from MM Co.
BANCIL Building Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map**

Leq,n
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/11/2020
Processed with SoundPLAN 8.1., Update 10/23/2018

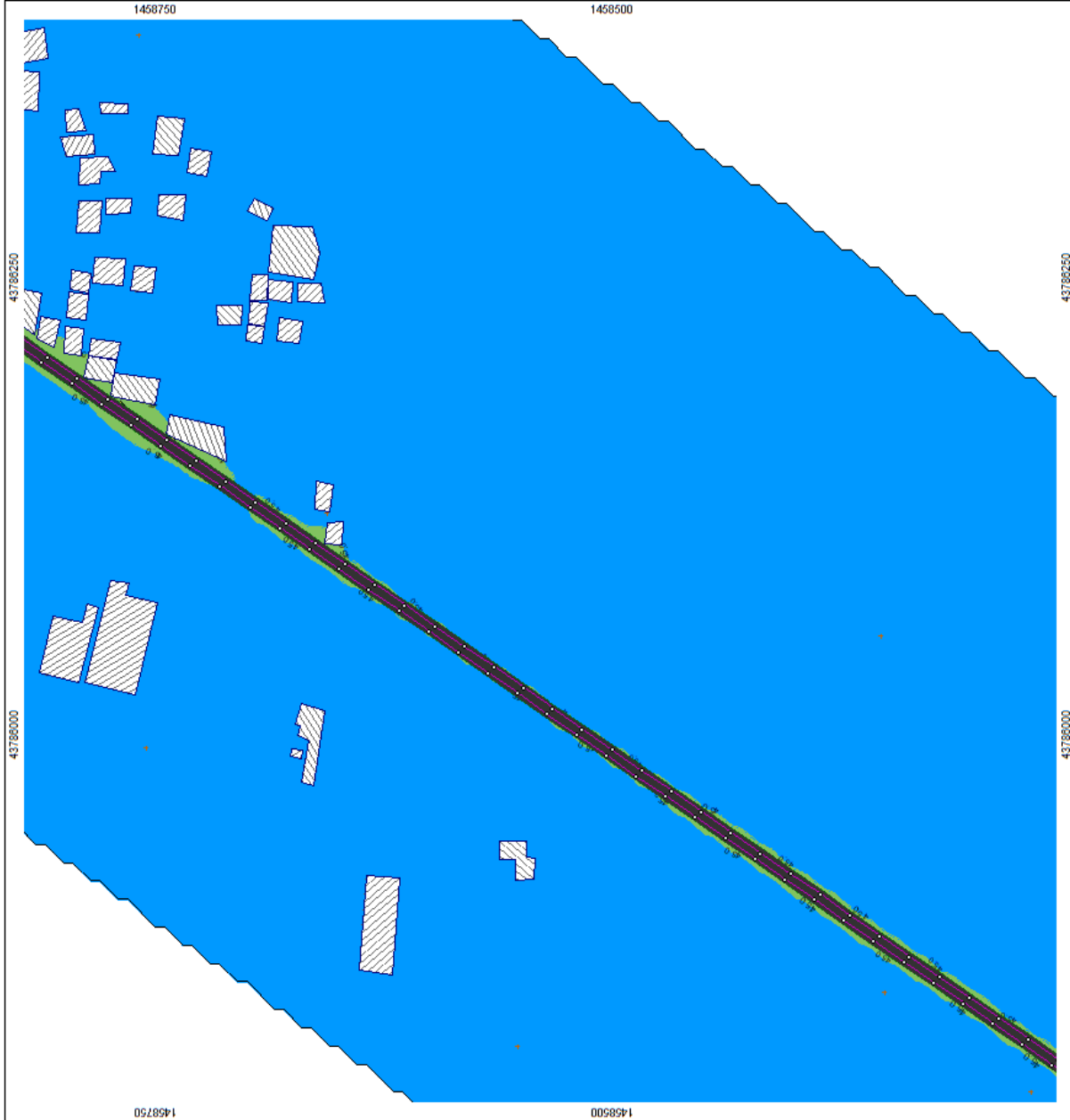
**Levels Leq,n
in dB(A)**



Signs and symbols

- Wall
- Construction Equip
- ▨ Main building
- ★ Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Wall
- Elevation point
- Bodeneffekte
- Nicht-radiation area

Length scale 1:2109



KR Puram to Kempegowda International Airport

Operational Noise:
 Buildings from Street Map and Google Earth.
 Train noise power levels taken from DEU Soundplan 8.1 Library and
 specific building Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
 Noise Contour Map
 Leq,d**

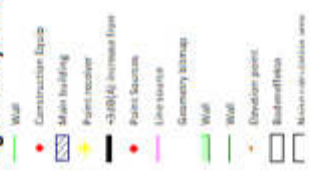
Calculation in 1.5 m above ground

Project engineer: OMR
 Created: 01/12/2018
 Project: with soundPLAN 8.1, Update 10/01/2018

**Levels Leq,d
 in dB(A)**



Signs and symbols



Length scale 1:2109



KR Puram to Kempegowda International Airport

Operational Noise.
Buildings from Street Map and Google Earth.
Train noise power levels taken from EMU Soundplan 8.1 Library and
BMRC Rolling Stock Specification. Train schedule and
speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,n
Calculation in 1.5 m above ground**

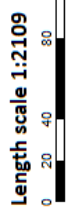
Project engineer: CMR
Created: 9/11/2020
Processed with SoundPLAN 8.1, Update: 10/23/2018

Levels Leq,n
in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodentiefe
- Noise calculation area



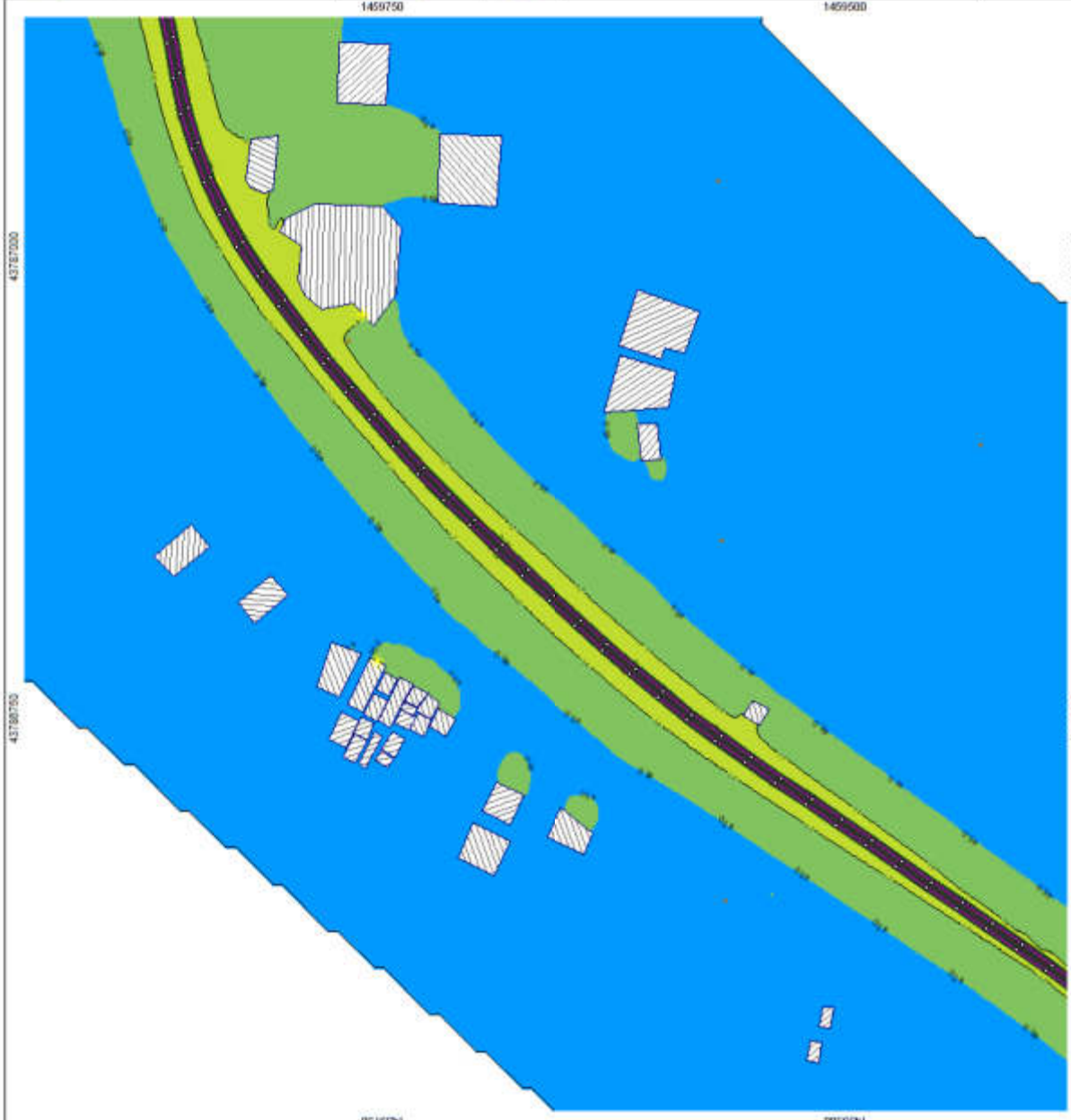
KR Puram to Kempegowda International Airport

Operational Noise
Buildings from Street Map and Google Earth.
Noise contours from the final SoundPLAN 8.1. Library and
MATHC. Rail track South of station. Train schedule and
speeds from feasibility study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**
Calculation in 1.5 m above ground

Project engineer: DMA
Contact: 90170230
Processed with SoundPLAN 8.1, Update 10/23/2018

- Levels Leq,d**
in dB(A)
- < 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - >= 65
- Signs and symbols**
- Construction fence
 - Wall
 - Miles building
 - Poles receiver
 - <LdB(A) increase from
 - Point Sources
 - Line source
 - Geometry (shading)
 - Wall
 - Wall
 - Elevation point
 - Receiver/Listener
 - Receiver/Listener (station area)



KR Puram to Kempegowda International Airport

Operational Noise.
Buildings from Street Map and Google Earth.
Train noise power levels taken from BMU Soundplan 8.1 Library and BMRCL Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

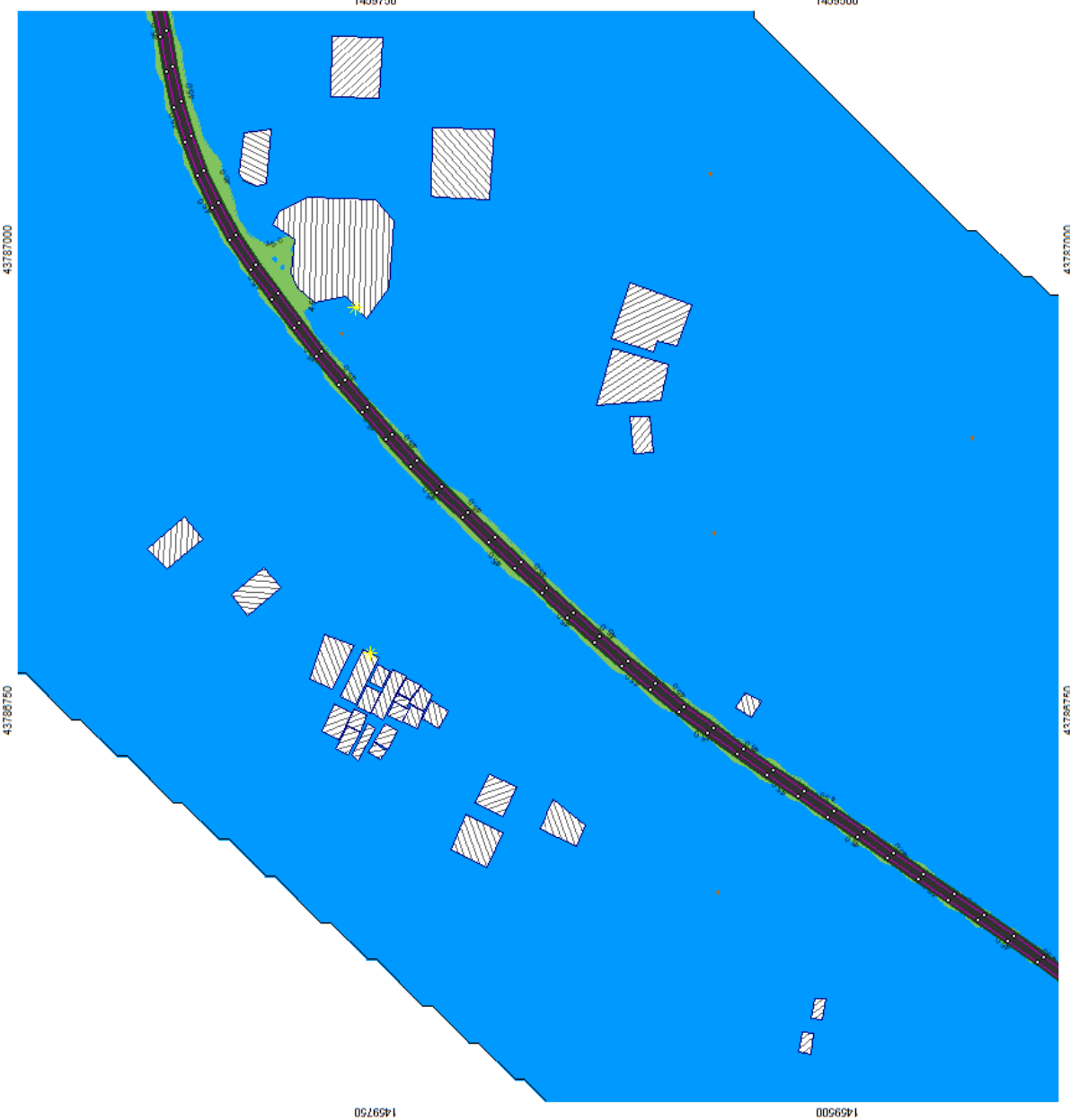
Project engineer: CMR
Created: 9/11/2020
Processed with SoundPLAN 8.1, Update 10/23/2018

Levels Leq,n
In dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry bitmap
- Wall
- Elevation point
- Bodeneffekte
- Noise calculation area



KR Puram to Kempegowda International Airport

Operational Noise:
Buildings from Street Map and Google Earth.
Background noise level from WHO/EC Directive L1 Library and
Metro Railway Station & stations. From Vidyashree and
Speed Train Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**

Calculation in 1.5 m above ground

Project engineer: CMK
Created: 3/11/2020
Processed with soundPLAN 8.1, Update 10/21/2018

Levels Leq,d in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Wall
- Construction Equip.
- Main building
- Point receiver
- +5dB(A) increase here
- Point Source
- Line source
- Secondary building
- Wall
- Elevator point
- Bottomplate
- Meteorological noise area

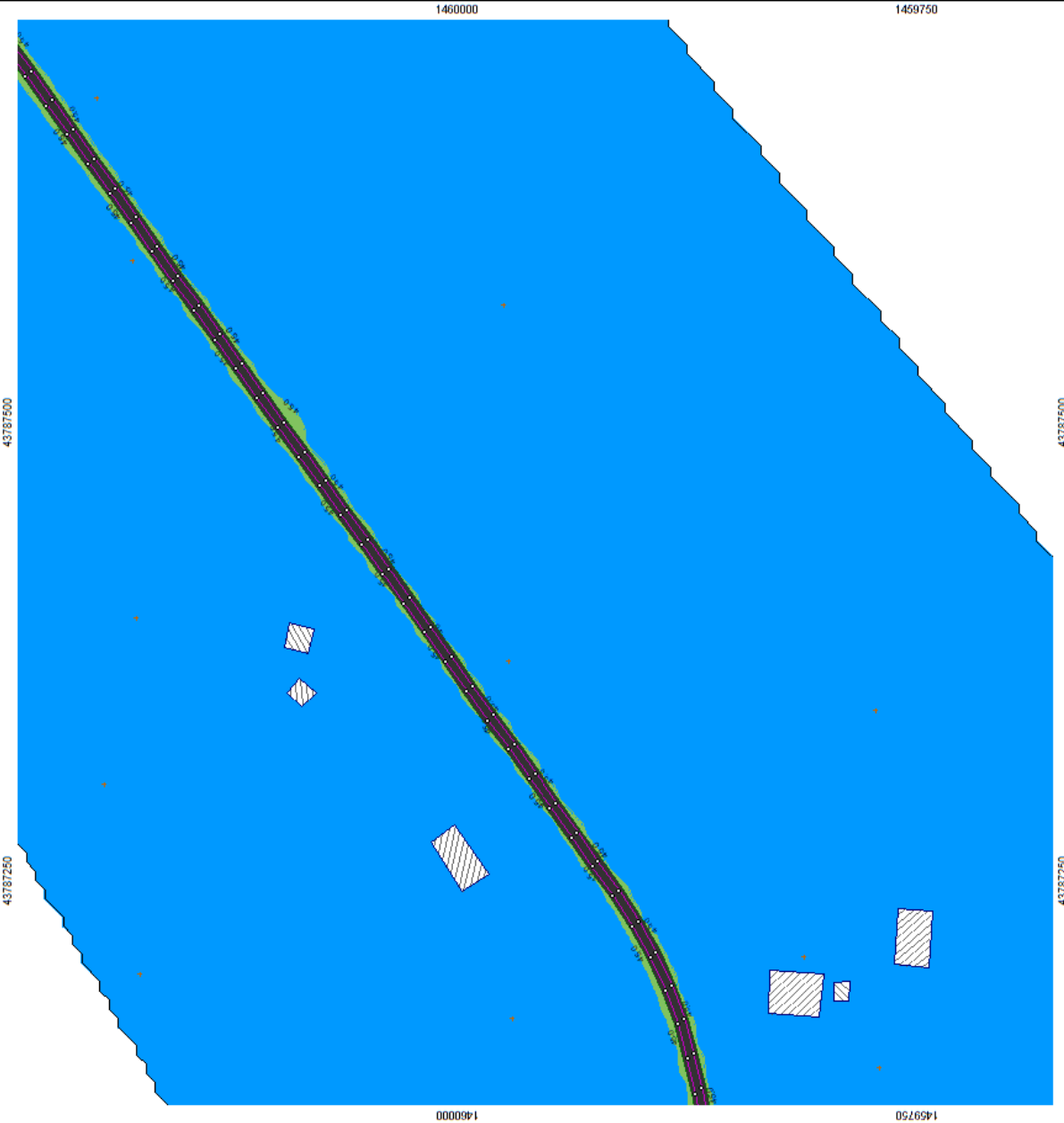


KR Puram to Kempegowda International Airport

Operational Noise.
Buildings from Street Map and Google Earth.
Train noise power levels taken from BMU Soundplan 8.1 Library and BIRCL Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,n**
Calculation in 1.5 m above ground

Project engineer: CMR
Created: 9/11/2020
Processed with SoundPLAN 8.1, Update 10/03/2018



Levels Leq,n
In dB(A)



Signs and symbols

- Construction Equip
- Main building
- Point receiver
- +3dB(A) increase from
- Point Sources
- Line source
- Geometry blimp
- Wall
- Elevation point
- Bodeneffekte
- Noise calculation area

Length scale 1:2109



KR Puram to Kempegowda International Airport

Operational Noise
Buildings from Street View and Google Earth.
From noise power levels taken from DMU Spreadsheet 8.1. Library and
MILIT Building Stock Specifications. Train schedule from
Google from feasibility study.

**120 2031 2b with Parapet Wall
Noise Contour Map
Leq,d**

Calculation in 1.5 m above ground

Project engineer: DMH
Created: 01/12/2020
Presented with soundPLAN 8.1.1, Update 16/01/2018

Levels Leq,d in dB(A)

- < 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- >= 65

Signs and symbols

- Wall
- Construction Equip
- Main building
- Point receiver
- 10dB(A) increase from
- Point Source
- Line source
- Geometry change
- Wall
- Elevation point
- Backscatter
- Noise/obstruction area



KR Puram to Kempegowda International Airport

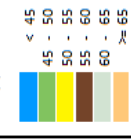
Operational Noise: Arrivals from West Map and Gopala Earth. Train engine levels taken from EMU Soundplan 8.1 Library and BMRC Rolling Stock Specification. Train schedule and speeds from Feasibility Study.

120 2031 2b with Parapet Wall Noise Contour Map
Leq,n
 Calculation in 1.5 m above ground

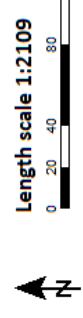
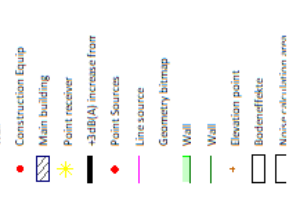
Project engineer: CMR
 Created: 9/11/2010
 Processed with SoundPLAN 8.1, Update 10/23/2018



Levels Leq,n
 in dB(A)



Signs and symbols



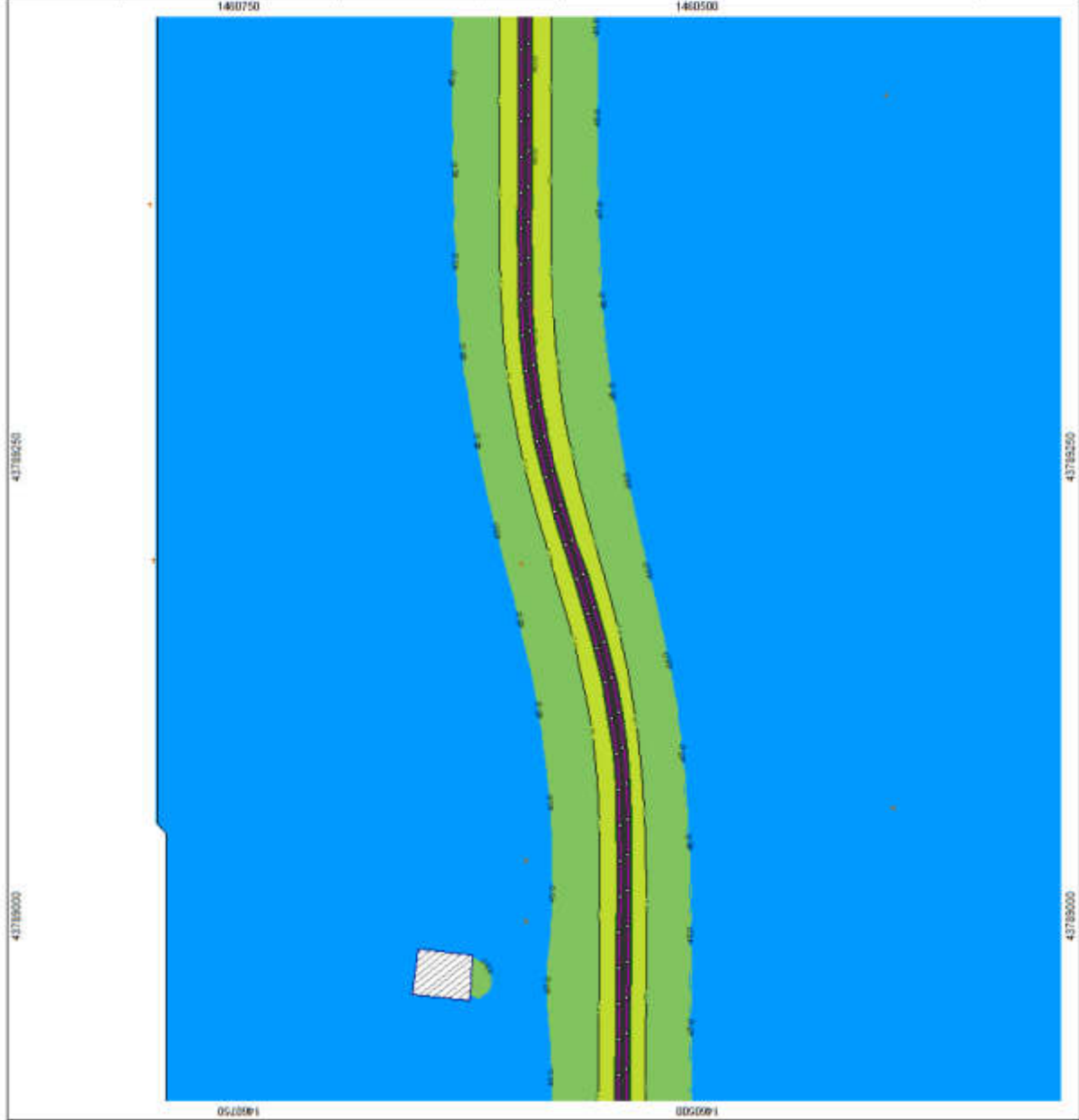
KR Puram to Kempegowda International Airport

Operational Noise:
 Building from Direct Map and Google Earth.
 The noise contours are based on the 2008 ICAO Annex 14 Library and
 ICAO, using the following assumptions: Terrain elevation and
 aspects from Feasibility Study.

**120 2031.2b with Parapet Wall
 Noise Contour Map
 Leq,d**
 Calculation in 1.5 m above ground

Project engineer: CMR
 Contour: 80/1/10/30
 Processed with SoundPLAN 8.1, Update 10/23/2018

- Levels Leq,d**
 In dB(A)
- < 45
 - 45 - 50
 - 50 - 55
 - 55 - 60
 - 60 - 65
 - 70 - 85
- Signs and symbols**
- Wall
 - Construction Equip
 - Main building
 - Point receiver
 - 10dB(A) increase from
 - Point Sources
 - Line Source
 - Geometry distance
 - Wall
 - Wall
 - Elevation point
 - Building/Block
 - Noise prediction area



KR Puram to Kempgowda International Airport

Operational Noise:
 Findings from Street Maps and Google Earth.
 Train noise from BMU SoundPLAN 8.1.1 Library and
 BMIRCI Rolling Stock Specification. Train schedule and
 speeds from Feasibility Study.

**120 2031 2b with Parapet Wall
 Noise Contour Map
 Leq,n**
 Calculation in 1.5 m above ground

Project engineer: CMR
 Created: 9/11/2020
 Processed with: SoundPLAN 8.1.1, Update 10/23/2018

Levels Leq,n
 in dB(A)

< 45
45 - 50
50 - 55
55 - 60
60 - 65
>= 65

Signs and symbols

Wall
Construction Equip
Main building
Point receiver
-3dB(A) increase from
Point Sources
Line source
Geometry bitmap
Wall
Wall
Elevation point
Bottomeflake
Noise reduction area

