



**PA 05909/17**

**PROPOSED MIXED-USE COMPLEX, MELLIEHA**

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**REPORT OF NOISE IMPACT STUDY**

**Version 1: May 2018**



**Report Reference:**

**Adi Associates Environmental Consultants Ltd, 2018. Proposed Mixed-use Complex, Mellieña. Report of Noise Impact Study. San Gwann, May 2018; vi + 18 pp.**

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## Quality Assurance

### Noise Impact Study for Proposed Mixed-use Complex, Mellieha Report of Noise Impact Study May 2018

Report for: **Towns End Mellieha Ltd**

### Revision Schedule

Rev	Date	Details	Written by:	Checked by:	Approved by:
00	May 2018	Submission to Client	<b>Eilis McCullough</b> Senior Consultant	<b>Rachel Xuereb</b> Director	<b>Adrian Mallia</b> Managing Director

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## INTRODUCTION

1. This report describes the Noise Impact Study undertaken in relation the vehicular traffic that will be generated by a proposed mixed-used commercial and residential development in Mellieħa (PA 05909/17). The development is hereinafter referred to as ‘the Scheme’.
2. The noise impact study was requested by the Environment and Planning Authority (ERA), following screening of the Scheme for Environmental Impact Assessment.
3. The noise impact study has been carried out in accordance with the Method Statement agreed by ERA on 5<sup>th</sup> March 2018, and included as **Appendix I**; the Terms of Reference for the study were issued by ERA on 22<sup>nd</sup> January 2018. The study was carried out having regard to the UK Department of Transport’s *Calculation of Road Traffic Noise (CRTN) 1988*<sup>1</sup> and *Design Manual for Roads and Bridges; Revision 1 – Noise and Vibration 2011*<sup>2</sup>, as well as having regard to IEC 61672 - 2013 Electroacoustics - sound level meters Parts 1, 2 and 3; and IEC 60942 - 2003 Electroacoustics - sound calibrator.

## THE SCHEME

4. The Scheme site is located on the southern perimeter of the Mellieħa Development Zone. The site is border by four roads - Triq Ħalq iċ-Ċawl, Triq I-lżbark tal-Franċiżi, Triq in-Nases, and Triq il-Fortizza. Triq il-Fortizza takes access off the main Triq il-Kbira. **Figure 1** shows the location of the Scheme site.
5. The Scheme takes the form of a 104-bed hotel (53 guestrooms) with ancillary facilities (restaurant, spa, gymnasium, and indoor pool), 121 residential units, and five retail units. There will be underground parking (198 parking spaces). Vehicular access to the Scheme will be from Triq I-lżbark tal-Franċiżi. **Figure 2** shows the layout drawing and vehicular access point.

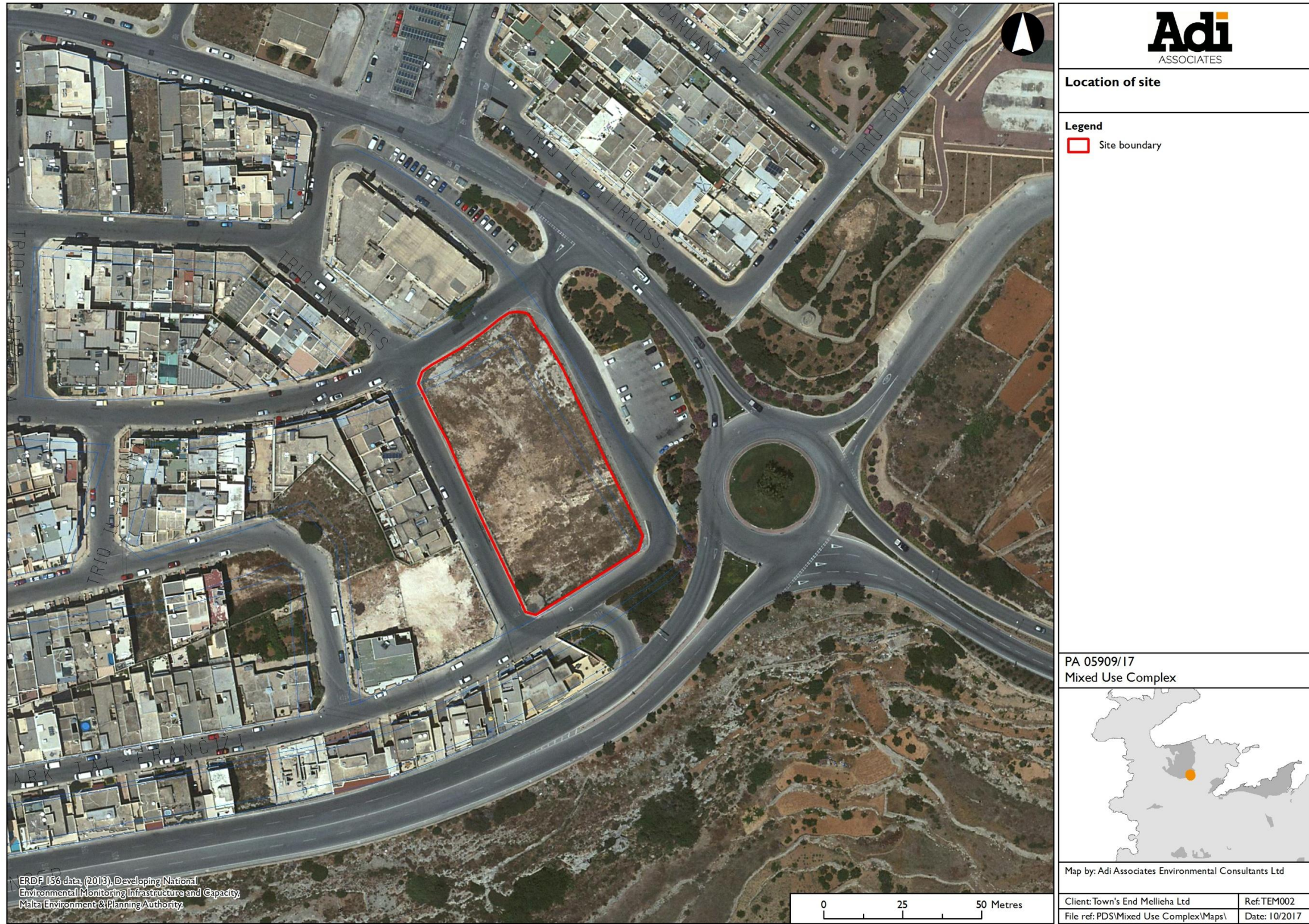
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<sup>1</sup> Department of Transport (UK), *Calculation of Road Traffic Noise 1988*.

<sup>2</sup> Department of Transport (UK), *Design Manual for Roads and Bridges; Revision 1 – Noise and Vibration 2011*.

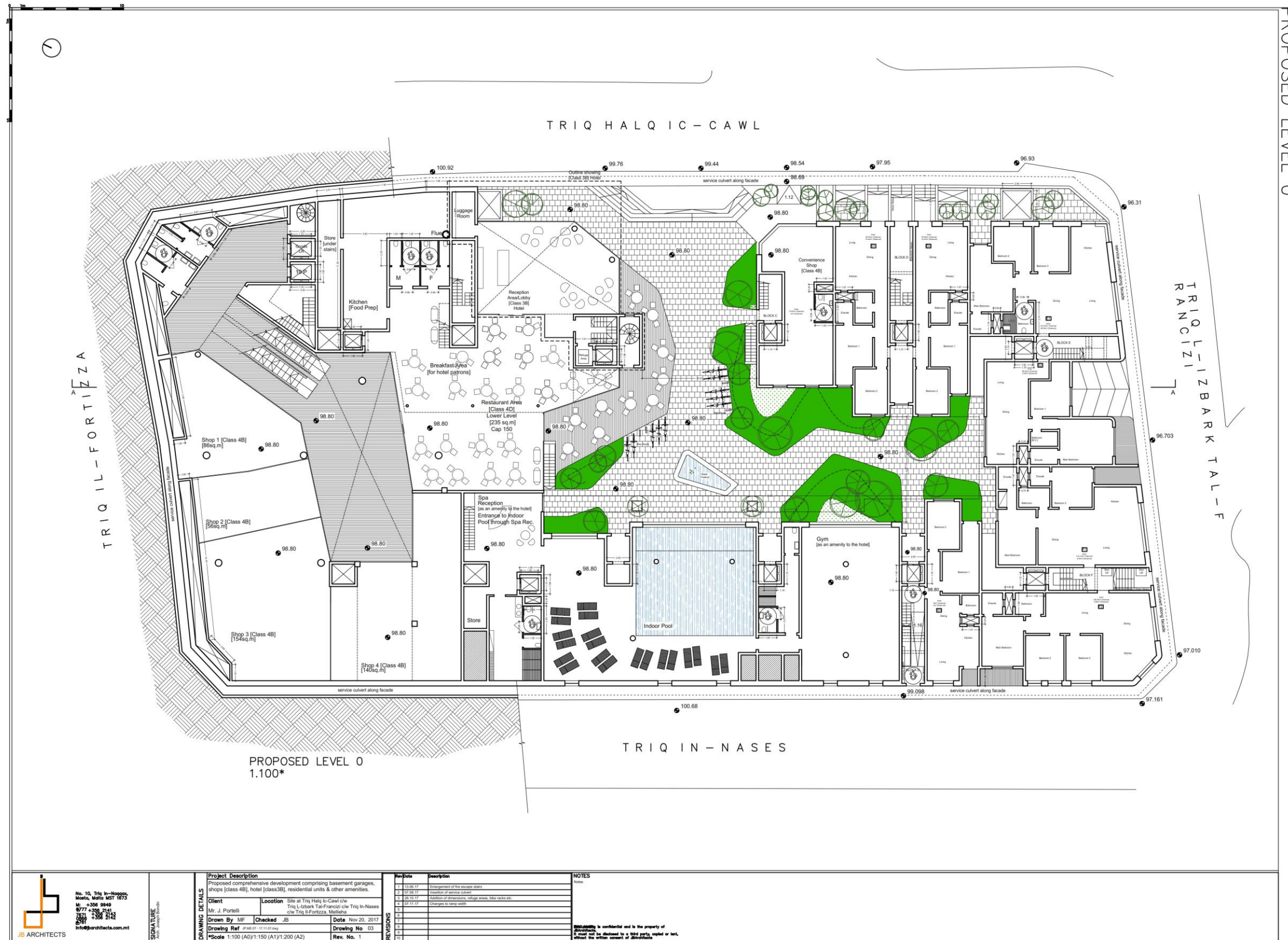


Figure 1: Location of the Scheme Site



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Figure 2: Scheme Layout



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**SIGNATURE**  
Mr. J. Portelli

<b>Project Description</b>	Proposed comprehensive development comprising basement garages, shops (class 4B), hotel (class 3B), residential units & other amenities.		
<b>Client</b>	Mr. J. Portelli	<b>Location</b>	Site at Triq Halqic-Cawl c/w Triq L-Izbark Tal-Francizi c/w Triq In-Nases c/w Triq Il-Fortizza, Msida
<b>Drawn By</b>	M.F.	<b>Checked</b>	J.B.
<b>Drawing Ref</b>	AD/1-150	<b>Date</b>	Nov 20, 2017
<b>Drawing No</b>	03	<b>Scale</b>	1:100 (A0) 1:150 (A1) 1:200 (A2)
<b>Rev. No.</b>	1		

Rev	Date	Description
1	13.08.17	Engagement of the escape stairs
2	14.08.17	Engagement of service corridor
3	26.10.17	Addition of dimensions, signage areas, site marks etc.
4	27.11.17	Changes to ramp width

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## SUMMARY OF THE METHODOLOGY

6. The methodology for assessing the impact of operational traffic noise involves predicting the change in what is the baseline noise level at the sensitive receptors at the time of the coming into operation of the Scheme. The first year of full operation for the Scheme is envisaged to be 2020.
7. The Transport Impact Assessment (TIA) prepared for the Scheme provides data on the predicted traffic flows on the road network around the Scheme site in 2020 without the Scheme (the predicted network flows) and with the Scheme (the predicted operational flows). These predictions are based on manual traffic counts undertaken in August 2017, during weekdays and on a Saturday in order to obtain representative flows and to determine the peak hours. The base traffic was increased at a rate of one per cent per annum between 2017 and 2020<sup>3</sup>. Traffic from committed developments was included in the 2020 base model; this included traffic from the Belle View redevelopment project<sup>4</sup>, located immediately to the north of the Scheme site, on Triq Il-Fortizza.
8. The baseline noise level at the sensitive receptors in the first year of full operation of the Scheme (2020) was established by measuring the current noise level from the traffic flow at the sensitive receptors and, by using the predicted network flow data from the TIA, predicting what would likely be the noise level from the traffic flow in 2020 without the Scheme.
9. In accordance with the guidance set out in CRTN 1988, the current noise level in terms of the index  $L_{10}$  (18-hr) dB(A) was obtained, that is, the level exceeded for 10% of the time over a measuring period of 18 hours<sup>5</sup>. In accordance with the guidance, the impact study considered the predicted change in the  $L_{10}$  (18-hr) baseline noise level.

## NOISE SENSITIVE RECEPTORS AND NOISE MONITORING POINTS

10. It is envisaged that traffic will enter and exit the Scheme site via a single ingress / egress point, located on Triq L-Iżbark tal-Franċiżi (see **Figure 2** above). Traffic will flow in a one-way system, approaching the Scheme site along Triq Ħalq iċ-Ċawl. The TIA predicts that the greatest impact on network traffic flows when the Scheme comes into full operation (2020) will be on Triq Ħalq iċ-Ċawl, Triq L-Iżbark tal-Franċiżi, Triq in-Nases, and Triq Il-Fortizza; the TIA also predicts that the traffic generated by the Scheme will primarily approach and leave the area from along the main Triq il-Kbira.

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<sup>3</sup> In accordance with the requirements of the Terms of Reference for the Transport Impact Assessment

<sup>4</sup> Permits granted in January 2017 (PA 02116/13) and November 2017 (PA 05369/17), to construct 28 apartment units, a supermarket and cafeteria, with underground parking.

<sup>5</sup> 06:00 to 24:00

11. There is a terrace of eight residential properties fronting Triq in-Nases, directly overlooking the Scheme site; these are the closest residential properties to the site and, taking account of the access arrangements and predicted traffic flows, are the sensitive receptors that will be most affected by traffic generated by the Scheme. The area immediately south of these properties is zoned for residential development, and the area immediately north of the Scheme site, overlooking Triq Il-Fortizza, is currently under construction for a residential development comprising 28 apartment units (Belle View)<sup>6</sup>. These future sensitive receptors will also be affected by traffic generated by the Scheme.
12. Having regard to the Scheme access arrangements, the predicted traffic flows as identified in the TIA, and the location of the existing and future noise sensitive receptors, noise levels were measured (and predicted) at two Monitoring Points (MPs) – see **Figure 3** and **Table 1**; **Figure 3** also illustrates the location of the noise sensitive receptors. The distance between the closest sensitive receptors<sup>7</sup> and the nearest edge of the relevant carriageway<sup>8</sup> is given in **Table 2**.

**Table 1: Location of Noise Monitoring Points**

Monitoring Point	Location	Eastings	Northings
MP 1	Triq in-Nases	43356	79261
MP 2	Triq Il-Fortizza	43347	79286

**Table 2: Location of Noise Sensitive Receptors**

Noise Sensitive Receptors	Distance from nearest edge of the carriageway (metres)
Triq in-Nases	2.6
Triq Il-Fortizza	4.6

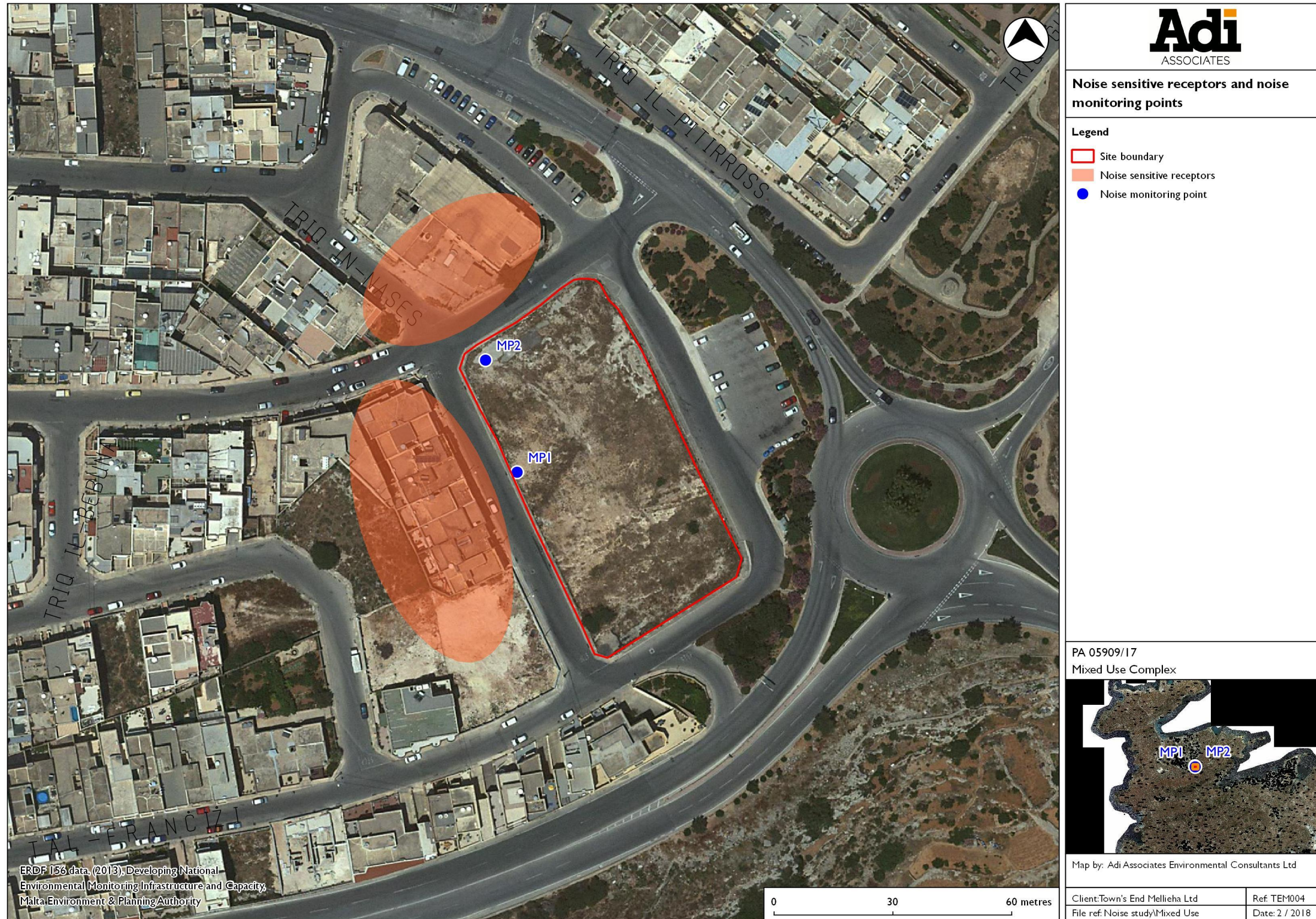
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<sup>6</sup> Permits granted in January 2017 (PA 02116/13) and November 2017 (PA 05369/17), to construct 28 apartment units, a supermarket and cafeteria, with underground parking.

<sup>7</sup> Taken to be an external aperture of a living room or bedroom on the nearest facade of the property.

<sup>8</sup> Taken to be the edge of the traffic lanes, excluding bus lay-bys, hard shoulders and hard strips.

**Figure 3: Location of the Noise Monitoring Points and Noise Sensitive Receptors**



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## SURVEY PROTOCOLS

13. Having regard to the CRTN guidance, the noise measurements were undertaken at a distance of approximately 4 m from the nearside carriageway edge<sup>9</sup>, so as to avoid influence of extraneous noise, and at least 15 m from any sound reflecting source (excluding the ground). A Type I Norsonic 140 NNR (Noise Nuisance Recorder), calibrated according to the guidance, was used to take the measurements (calibration certificates are included in the Method Statement - see **Appendix I**).
14. The sound level meter was calibrated before each set of measurements, in accordance with the guidance, and placed on a tripod stand 1.2 m above the level of the road surface. The measurements were undertaken when wind speeds were between 3 and 10 km/h and when road conditions were dry.

## BASELINE NOISE LEVELS

### Sound Level Measurements

15. Six sound level measurements were taken - three at each of the MPs. At each MP, and in accordance with the Shortened Measuring Procedure outlined in CRTN 1988, three 15-minute measurements were taken over a period of three consecutive hours to obtain the L<sub>10</sub> (3-hour) dB (A). The sound level measurements were taken on a Saturday, where the TIA predicted the largest increase in traffic flows on Triq in-Nases and Triq il-Fortizza to be on a Saturday morning. Specifically, the sound level measurements were conducted as described in **Table 3**.

**Table 3: Sound Level Measurements**

Monitoring Point	Noise Measurements
MP 1	Saturday 7 <sup>th</sup> April 2018 (10:07 – 10:22)
	Saturday 7 <sup>th</sup> April 2018 (11:00 – 11:15)
	Saturday 7 <sup>th</sup> April 2018 (12:00 – 12:15)
MP 2	Saturday 7 <sup>th</sup> April 2018 (10:28 – 10:43)
	Saturday 7 <sup>th</sup> April 2018 (11:20 – 11:35)
	Saturday 7 <sup>th</sup> April 2018 (12:19 – 12:34)

<sup>9</sup> The nearside edge of the carriageway is the edge of the traffic lanes, excluding bus lay-bys, hard shoulders and hard strips

16. The measured  $L_{10}$  (1-hr) dB(A) sound levels recorded are shown in **Table 4**. Using the  $L_{10}$  (3-hr) as the arithmetic mean of the three consecutive values of hourly  $L_{10}$ , the current value of  $L_{10}$  (18-hr) dB(A) was calculated using the formula:  $L_{10} (18-hr) = L_{10} (3-hr) - 1$  dB(A). The calculated  $L_{10}$  (18-hr)dB(A) sound levels are shown in **Table 5**.

**Table 4: Recorded  $L_{10}$  (15-min) dB(A) Sound Levels**

Monitoring Point	$L_{10}$ (15-min) dB(A)		
MP 1	59.3	56.7	57.8
MP 2	60.4	61.0	63.3

**Table 5: Calculated  $L_{10}$  (3-hr) dB(A) and  $L_{10}$  (18-hr) dB(A) Sound Levels**

Monitoring Point	$L_{10}$ (3-hr) dBA	$L_{10}$ (18-hr) dBA
MP 1	57.9	56.9
MP 2	61.6	60.6

### Current Traffic Flows

17. The actual traffic flows measured along Triq in-Nases and Triq il-Fortizza, and adjusted to equate to the 18-hour flows, are shown in **Table 6**. In accordance with CRTN guidance, the flow of traffic in both directions along Triq in-Nases and Triq il-Fortizza was aggregated to obtain the total flow, and the number of heavy vehicles was noted.

**Table 6: Current 18-hour Traffic Flows**

Road	18-hour Traffic Flows		
	Heavy Vehicles	Light Vehicles	Total Traffic
Triq in-Nases (relevant to MP 1)	36	832	868
Triq Il-Fortizza (relevant to MP 2)	201	3,520	3,721

### Predicted Traffic Flows

18. The predicted total flows for Triq in-Nases and Triq il-Fortizza in 2020 without the





Scheme and with the Scheme in operation, derived from the TIA, and adjusted to equate to the 18-hour flows, are shown in **Table 7**. Again, in accordance with the guidance, the flow of traffic in both directions was aggregated to obtain the total flow. It has reasonably been assumed that the percentage of heavy vehicles recorded in the 2017 traffic surveys is unchanged in 2020.

**Table 7: Predicted 18-hour Traffic Flows in 2020 without the Scheme and with the Scheme in operation**

Road	2020 18-hr Traffic Flows (Total Traffic)	
	Without Scheme	With Scheme in Operation
Triq in-Nases (relevant to MP 1)	885	1,591 (+ 706)
Triq il-Fortizza (relevant to MP 2)	4,063	4,769 (+706)

**Baseline Noise Levels**

19. As mentioned, the baseline noise level at the sensitive receptors was taken to be the noise level in 2020 without the Scheme in operation. The methodology for calculating the baseline noise levels involved first calculating the predicted noise levels ( $L_{10}$  (18-hr) dB(A) in 2020 at the MPs, and then subsequently correcting these to establish the noise levels ( $L_{10}$  (18-hr) dB(A) at the sensitive receptors (to take account of the distance to the sensitive receptors from the carriageway, and other propagation factors as necessary).
20. In accordance with the CRTN guidance, the 2020 values of  $L_{10}$  (18-hr) dB(A) at the MPs were calculated by correcting the  $L_{10}$  (18-hr) dB(A) values for the current traffic conditions, having regard to the predicted traffic flows on Triq in-Nases and Triq il-Fortizza in 2020 without the Scheme (the predicted network flows as identified in the TIA)<sup>10</sup>. For these calculations, it was assumed that the percentage of heavy vehicles and the average traffic speeds recorded in the 2017 traffic surveys were unchanged in 2020. The calculated  $L_{10}$  (18-hr) dB(A) values in 2020 at the MPs are shown in **Table 8**.

**Table 8: Calculated  $L_{10}$  (18-hr) dB(A) Sound Levels at the Noise Monitoring Points in 2020 without the Scheme**

Monitoring Point	$L_{10}$ (18-hr) dB(A)
MP 1	57.0
MP 2	61.0

<sup>10</sup> The respective correction values were: MP 1 (+0.08) and MP 2 (+0.38)

21. The calculated 2020  $L_{10}$  (18-hr) dB(A) values at the MPs were then used to determine the  $L_{10}$  (18-hr) dB(A) sound levels at the sensitive receptors – the baseline noise levels at the sensitive receptors for the purposes of the impact assessment. A distance correction was applied in both cases, in accordance with the guidance<sup>11</sup>. There was no need to apply a correction for obstructions in the case of either of the sensitive receptors since the noise source line (between the carriageway and the reception point) is unobstructed. Additionally, there was no need to apply a ground cover correction since the ground surface between the edge of the nearside carriageway and the reception point at the sensitive receptors in both cases is of a non-absorbent nature. The corrected 2020  $L_{10}$  (18-hr) dB(A) values at the sensitive receptors – the baseline noise levels for the purposes of the impact study - are shown in **Table 9**.

**Table 9: Baseline Noise Levels ( $L_{10}$  (18-hr) dB(A))**

Noise Sensitive Receptors	$L_{10}$ (18-hr) dB(A)
Triq in-Nases	58.0
Triq Il-Fortizza	62.0

## NOISE LEVELS WITH SCHEME IN OPERATION

22. The calculated  $L_{10}$  (18-hr) dB(A) values in 2020 at the MPs with the Scheme in operation are shown in **Table 10**<sup>12</sup>. The corrected 2020  $L_{10}$  (18-hr) dB(A) values at the sensitive receptors with the Scheme in operation are shown in **Table 11**.

**Table 10: Calculated  $L_{10}$  (18-hr) dB(A) Sound Levels at the Noise Monitoring Points in 2020 with the Scheme in Operation**

Monitoring Point	$L_{10}$ (18-hr) dB(A)
MP 1	59.5
MP 1	61.7

**Table 11: Noise Levels at the Sensitive Receptors with the Scheme in Operation**

<sup>11</sup> The distance correction value was +1 in the case of both MP 1 and MP 2, having regard to Chart 7 of CRTN

<sup>12</sup> The respective correction values were: MP 1 (+2.54) and MP 2 (+0.70)



Noise Sensitive Receptors	L <sub>10</sub> (18-hr) dB(A)
Triq in-Nases	60.5
Triq Il-Fortizza	62.7

## NOISE IMPACT

23. In accordance with the guidance<sup>13</sup>, the impact assessment considered the predicted change in the baseline noise level, where the baseline noise level was the 2020 L<sub>10</sub> (18-hr) dB(A) value at the sensitive receptors without the Scheme. The predicted change in noise climate in 2020 arising from operational traffic (with the Scheme in operation) is presented in **Table 12**.

**Table 12: Predicted Change in Noise Levels at the Sensitive Receptors in 2020**

Noise Sensitive Receptor	Noise levels without the Scheme (L <sub>10</sub> (18-hr) dB(A))	Noise levels with the Scheme in Operation (L <sub>10</sub> (18-hr) dB(A))	Change in L <sub>10</sub> (18-hr) dB(A)
Triq in-Nases	58.0	60.5	+ 2.5
Triq Il-Fortizza	62.0	62.7	+0.7

24. Based on the guidance set out in DMRB, Part 7, the following significance criteria were used to assess the significance of impacts arising from traffic generated by the Scheme on the noise climate at the sensitive receptors in 2020:
- **Not significant** (a change of less than 1.0 dB to the baseline noise level);
  - **Minor significance** (a change of between 1.0 and 2.9 dB to the baseline noise level);
  - **Moderate significance** (a change of between 3.0 and 4.9 dB to the baseline noise level); and
  - **Major significance** (a change of 5 dB or higher to the baseline noise level).
25. The significance of the predicted noise levels at the sensitive receptors, as described above, is determined through reference to the predicted change in background noise levels as a result of the predicted change in traffic flows.
26. Comparison of the significance criteria described with the predicted noise levels shows that the noise impact from the traffic envisaged to be generated by the

<sup>13</sup> Department of Transport (UK), *Design Manual for Roads and Bridges; Revision 1 – Noise and Vibration 2011*, Part 7



Scheme is likely to be of minor significance in relation to the existing sensitive receptors Triq in-Nases, with a predicted change in the noise level of +2.5 dB. In the case of the future sensitive receptors on Triq Il-Fortizza, with a predicted change in the noise level of +0.7 dB, the noise impact from the traffic envisaged to be generated by the Scheme is likely to be 'not significant'.



## **Appendix I: Noise Impact Study Method Statement**



**PA 05909/17**

**PROPOSED MIXED-USE COMPLEX, MELLIEHA**

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**METHOD STATEMENT FOR NOISE IMPACT STUDY**

**Version 1: February 2018**





**Report Reference:**

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## Quality Assurance

### Noise Impact Study for Proposed Mixed-use Complex, Mellieha Method Statement February 2018

Report for: **Town's End Mellieha Ltd**

#### Revision Schedule

Rev	Date	Details	Written by:	Checked by:	Approved by:
00	Feb 2018	Submission to client	<b>Eilis McCullough</b> Senior Consultant	<b>Rachel Xuereb</b> Director	<b>Adrian Mallia</b> Managing Director

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## INTRODUCTION

27. This method statement outlines the methodology for a noise impact study in relation to the vehicular traffic that will be generated by a proposed mixed-used commercial and residential development in Mellieha (see site location map in **Figure 1**). The development is hereinafter referred to as 'the Scheme'.
28. The Scheme takes the form of a 104-bed hotel (53 guestrooms) with ancillary facilities (restaurant, spa, gymnasium and indoor pool), 121 residential units, and five retail units. There will be underground parking (198 parking spaces). Vehicular access to the Scheme will be from Triq l-Iżbark tal-Franċiżi (see layout drawing in **Figure 2**).

## TERMS OF REFERENCE

29. The noise impact study has been requested by the Environment and Planning Authority (ERA), following screening for Environmental Impact Assessment (EIA) based on a Project Description Statement (PDS) for the Scheme submitted in December 2017. In a letter dated 22<sup>nd</sup> January 2018, ERA advised the applicant of the need for a “*Noise Impact Study to be carried out to assess the extent of the...noise impacts...in view of the envisaged increase in traffic from the proposed development*”<sup>14</sup>.
30. The detailed Terms of Reference (ToR) for the noise impact study are included in **Appendix I**.
31. Part 9 of the ToR requires that the report of the noise impact study should describe “*the surrounding area within a 1km radius from the site – this shall include identification of the types of activities, whether residential or commercial, roads and other amenities*”. The last bullet point of Part 9 also states “*a noise map may be required both for baseline studies and for prediction showing the sensitive receptor exposure to noise*”.
32. Any noise study must necessarily include an examination of the land uses and activities in the area in the vicinity of the noise source, in order to inform the identification of the noise sensitive receptors likely to be affected by the noise source, and the description of the ambient noise climate (including extraneous noise sources and land uses and activities that could influence the noise source subject of the study). Additionally, where it is expected that the noise generated by the noise source will result in noise nuisance to a wide area, a noise map of the area is useful in determining the extent and significance of the nuisance within this area. However, for the noise impact study, it is proposed to include a description of the area within 250 m of the Scheme site, and to determine the predicted noise levels at the noise sensitive receptors likely to be most affected by traffic noise generated by the

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<sup>14</sup> An air quality impact study has also been requested. The method statement for the air quality impact study, also prepared by Adi Associates Environmental Consultants Ltd, is presented in a separate document.

Scheme when it comes into operation, for the following reasons:

- The Transport Impact Assessment (TIA) prepared for the Scheme<sup>15</sup> predicts that it is the roads surrounding the Scheme site (Triq Ғalq iċ-Ĉawl, Triq L-lżbark tal-Franċiżi, Triq in-Nases, and Triq Il-Fortizza) that will be most affected by an increase in traffic as a result of the Scheme. Hence, the sensitive receptors most likely to be affected are the land uses fronting the said roads (residential properties, as described below).
- The TIA reveals that the roads surrounding the Scheme site are not heavily-trafficked and further predicts that the network traffic flows<sup>16</sup> on these roads in the first year of full operation of the Scheme (2020) will remain low. Hence, traffic noise levels in 2020 without the Scheme are likely to be relatively low.
- The TIA predicts that Triq Ғalq iċ-Ĉawl and Triq L-lżbark tal-Franċiżi will see a doubling in traffic as a result of the Scheme, and the rule of thumb for noise emissions is that a doubling in traffic will result in an increase in noise levels by 3 dB. However, where the TIA predicts that the network traffic flows on these roads in 2020 will be low, traffic noise levels without the Scheme are also expected to be low; therefore, a predicted 3 dB increase in noise is unlikely to be significant. Hence, where there is unlikely to be a significant noise nuisance as a result of traffic generated by the Scheme at the sensitive receptors to be most affected, it is reasonable to expect that noise arising from Scheme-generated traffic will not be a nuisance for sensitive receptors in the wider area, and, therefore, that there is no need for noise mapping of the wider area.

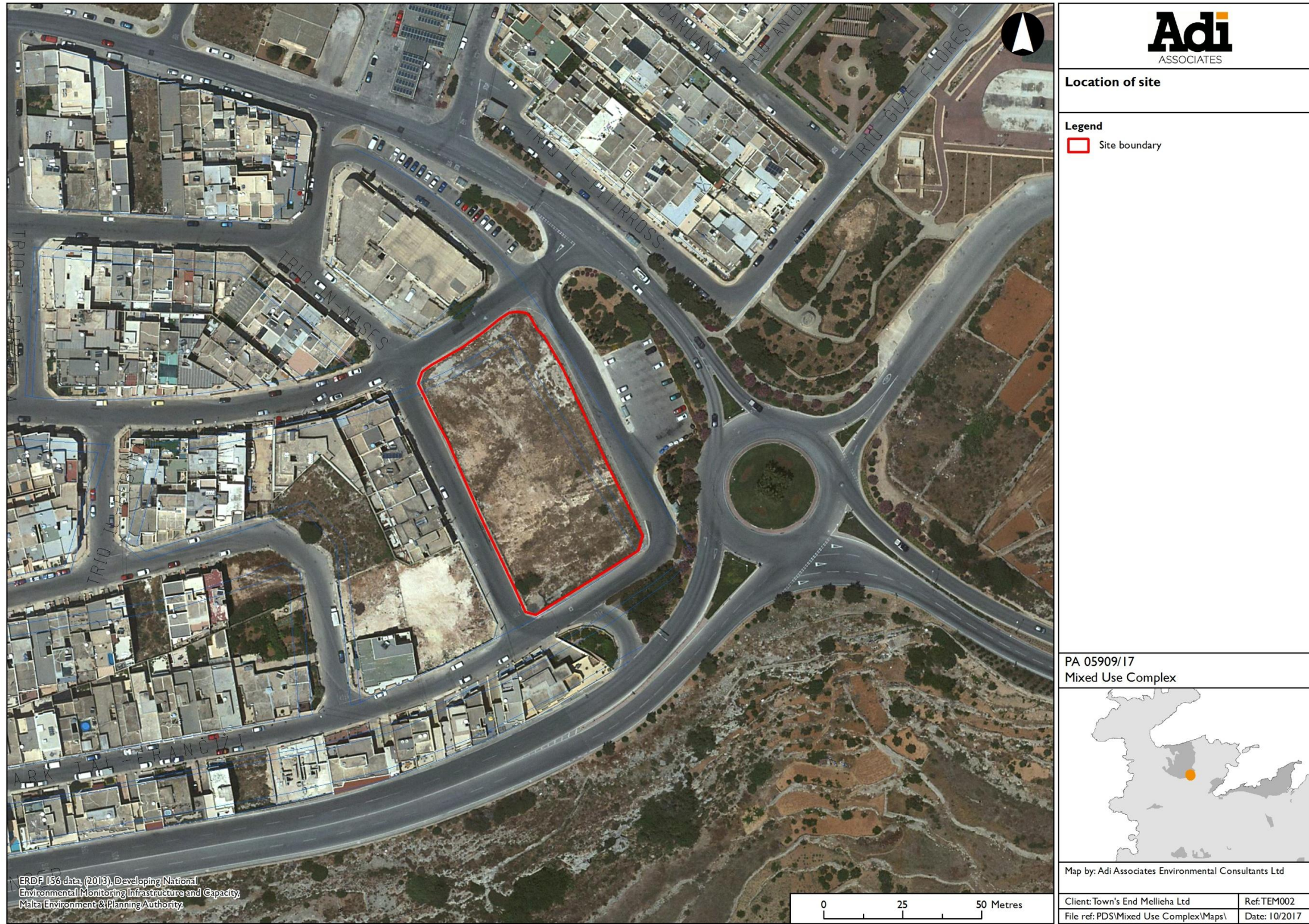
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<sup>15</sup> PA 05909/17 - Proposed Mixed-use Complex, Mellieha: Transport Impact Assessment, December 2017. Adi Associates Environmental Consultants Ltd. 2017.

<sup>16</sup> The traffic flows without the Scheme.

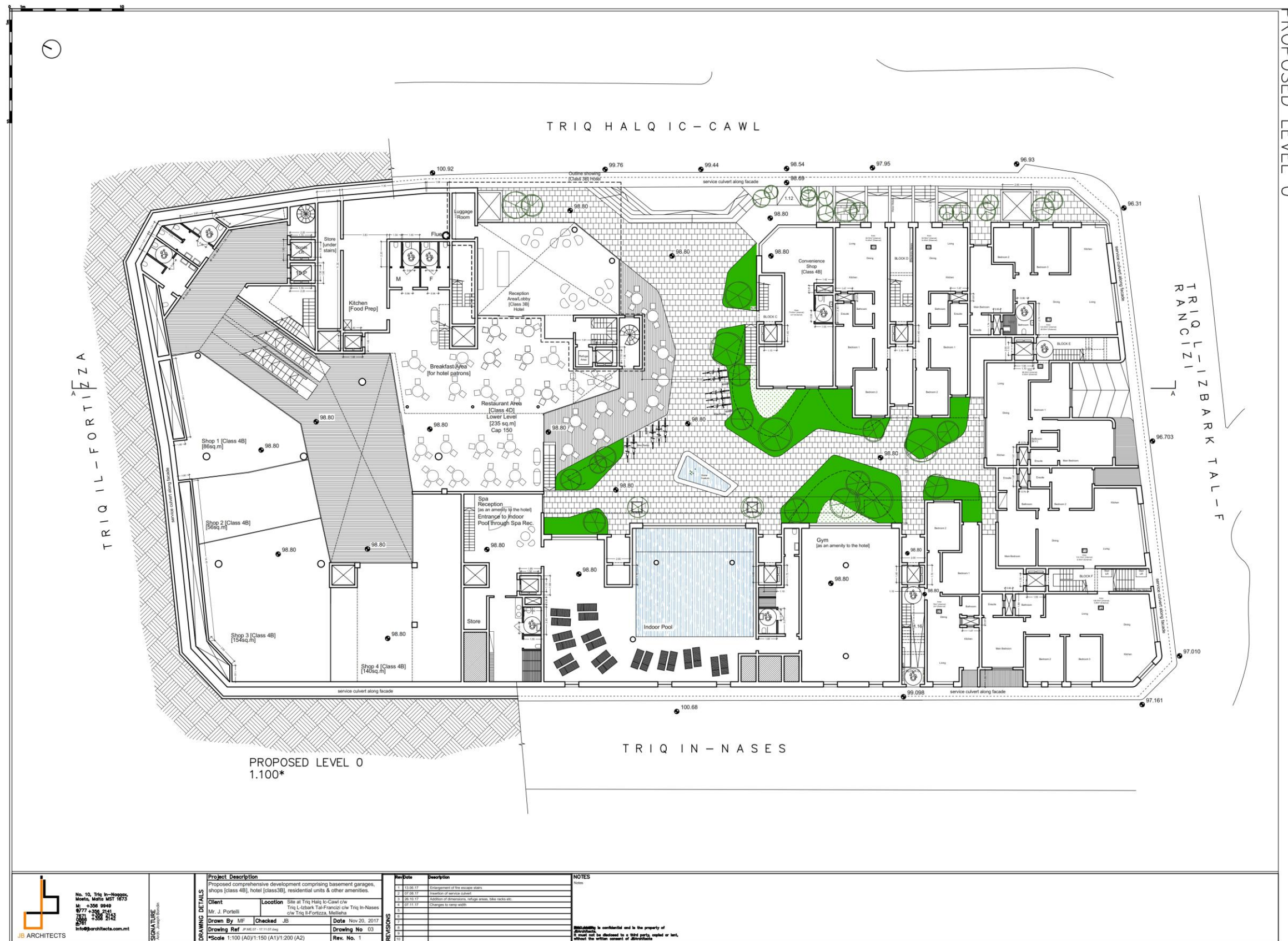


Figure 1: Location of the Scheme Site



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Figure 2: Scheme Layout



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**SIGNATURE**  
Mr. J. Portelli

Project Description	
Proposed comprehensive development comprising basement garages, shops (class 4B), hotel (class 3B), residential units & other amenities.	
Client	Location
Mr. J. Portelli	Site at Triq Halqic-Cawl c/w Triq L-Izbark Tal-Francizi c/w Triq In-Nases c/w Triq Il-Fortizza, Meris
Drawn By	Checked
M.F.	J.B.
Drawing Ref	Date
AD/1-150 (A1)/1-200 (A2)	Nov 20, 2017
Drawing No	Rev. No.
03	1

Rev	Date	Description
1	13.08.17	Engagement of the escape stairs
2	14.08.17	Engagement of service staircase
3	26.10.17	Addition of dimensions, signage areas, site marks etc.
4	27.11.17	Changes to ramp width

**NOTES**  
1. Responsibility is undertaken and is the property of JB ARCHITECTS.  
2. It must not be disclosed to a third party, copied or lent, without the written consent of JB ARCHITECTS.

## STANDARDS AND GUIDANCE

33. The following standards and guidance have informed the methodology for the noise impact study:
- UK Department of Transport's *Calculation of Road Traffic Noise (CRTN) 1988*<sup>17</sup>;
  - UK Department of Transport's *Design Manual for Roads and Bridges; Revision 1 – Noise and Vibration 2011*<sup>18</sup>;
  - UK's Department for Environment, Food and Rural Affairs (Defra) *Method for Converting the UK Road Traffic Noise Index  $L_{10, 18h}$  to the EU Noise Indices for Road Noise Mapping*<sup>19</sup>;
  - IEC 61672 - 2013 Electroacoustics - sound level meters Parts 1, 2 and 3; and
  - IEC 60942 -- 2003 Electroacoustics - sound calibrator.

## NOISE SENSITIVE RECEPTORS AND NOISE MONITORING POINTS

34. It is envisaged that traffic will enter and exit the Scheme via a single ingress / egress point, located on Triq L-Iżbark tal-Franċiżi (see **Figure 2**). Traffic will flow in a one-way system, approaching the Scheme site along Triq Ħalq iċ-Ċawl. As mentioned, the TIA predicts that the greatest impact on network traffic flows when the Scheme comes into full operation (2020) will be on Triq Ħalq iċ-Ċawl, Triq L-Iżbark tal-Franċiżi, Triq in-Nases, and Triq Il-Fortizza; the TIA also predicts that the traffic generated by the Scheme will primarily approach and leave the area from along the main Triq il-Kbira.
35. There is a terrace of eight residential properties fronting Triq in-Nases, directly overlooking the Scheme site; these are the closest residential properties to the site and, taking account of the access arrangements and predicted traffic flows, are the sensitive receptors that will be most affected by traffic generated by the Scheme. The area immediately south of these properties is zoned for residential development, and the area immediately north of the Scheme site, overlooking Triq Il-Fortizza, is currently under construction for a residential development comprising 28 apartment units (Belle View)<sup>20</sup>. These future sensitive receptors will also be affected by traffic generated by the Scheme.
36. Having regard to the Scheme access arrangements, the predicted traffic flows as

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<sup>17</sup> Department of Transport (UK), *Calculation of Road Traffic Noise 1988*.

<sup>18</sup> Department of Transport (UK), *Design Manual for Roads and Bridges; Revision 1 – Noise and Vibration 2011*.

<sup>19</sup> Department for Environment, Food and Rural Affairs (DEFRA) (UK) *Method for Converting the UK Road Traffic Noise Index  $L_{10, 18h}$  to the EU Noise Indices for Road Noise Mapping*, 2006.

<sup>20</sup> Permits granted in January 2017 (PA 02116/13) and November 2017 (PA 05369/17), to construct 28 apartment units, a supermarket and cafeteria, with underground parking.

identified in the TIA, and the location of the existing and future noise sensitive receptors, it is proposed to measure and predict noise levels at two Monitoring Points (MPs). The indicative locations of these MPs are illustrated in **Figure 3**; **Figure 3** also illustrates the location of the noise sensitive receptors. The distance between the closest sensitive receptors<sup>21</sup> and the nearest edge of the relevant carriageway<sup>22</sup> is given in **Table I**.

**Table I: Location of Noise Sensitive Receptors**

Noise Sensitive Receptor	Distance from nearest edge of the carriageway (metres)
Triq in-Nases	2.6
Triq Il-Fortizza	4.6

## SURVEY PROTOCOLS

37. Having regard to CRTN guidance, the noise measurements will be undertaken at a distance of approximately 4 m from the nearside carriageway edge, so as to avoid influence of extraneous noise, and at least 15 m from any sound reflecting source (excluding the ground). A Type I Norsonic 140 NNR (Noise Nuisance Recorder), calibrated according to the guidance, will be used to take the measurements (calibration certificates will be included in the report). The sound level meter will be field calibrated before each set of measurements, in accordance with the guidance, and placed on a tripod stand 1.2 m above the level of the road surface.

## SOUND LEVEL MEASUREMENTS

38. It is proposed to undertake six sound level measurements, three at each of the MPs. In accordance with CRTN guidance, the current noise level in terms of the index  $L_{10}$  (18-hour) dB (A) will be obtained, that is, the level exceeded for 10% of the time over a measuring period of 18 hours<sup>23</sup>. The Shortened Measuring Procedure will be employed, whereby at each of the MPs three 15-minute measurements will be conducted over a period of three consecutive hours (one measurement per hour) to obtain the  $L_{10}$  (3-hour) dB (A). Using the  $L_{10}$  (3-hour) as the arithmetic mean of the three consecutive values of  $L_{10}$ , the value of  $L_{10}$  (18-hour) dB (A) will be calculated using the formula:  $L_{10} (18\text{-hour}) = L_{10} (3\text{-hour}) - 1 \text{ dB(A)}$ <sup>24</sup>.
39. The TIA predicts that the biggest increase in traffic as a result of the Scheme will be on a Saturday, with the peak being between 11:00 – 12:00. Accordingly, it is proposed to undertake the noise measurements on a Saturday, in the three consecutive hours between 10:00 and 13:00.

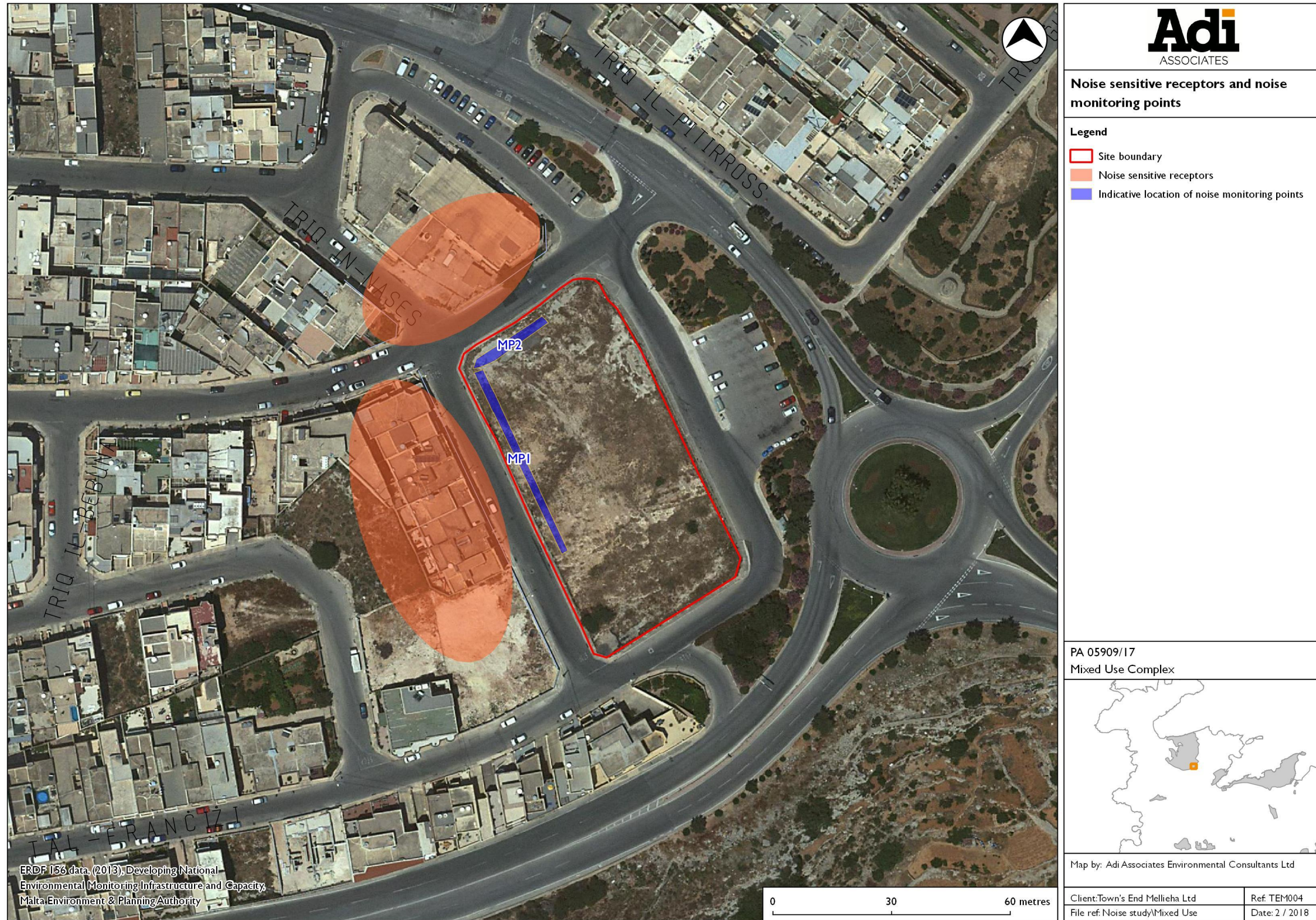
<sup>21</sup> Taken to be an external aperture of a living room or bedroom on the nearest facade of the property.

<sup>22</sup> Taken to be the edge of the traffic lanes, excluding bus lay-bys, hard shoulders and hard strips.

<sup>23</sup> The 18-hour period between 06:00 and 24:00.

<sup>24</sup> CRTN 1988, paragraph 43.

**Figure 3: Location of the Noise Monitoring Points and Noise Sensitive Receptors**



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## ESTABLISHING THE BASELINE NOISE LEVELS

40. The CRTN guidance outlines a methodology for predicting future traffic noise levels. This methodology will be used to predict the change in what is the baseline noise levels at the sensitive receptors at the time of the coming into operation of the Scheme; as mentioned, the first year of full operation of the Scheme is envisaged to be 2020.
41. The TIA provides data on the current traffic flows on the road network around the Scheme site, as well as data on the predicted network flows (without the Scheme) and the predicted operational flows (with the Scheme) in 2020. The baseline noise levels at the sensitive receptors in 2020 will be established by measuring the current noise levels and, by using the current traffic flow data and the predicted network flow data, predicting what will likely be the noise levels from the traffic flow in 2020 without the Scheme.
42. In accordance CRTN guidance, the flow of traffic in both directions along the carriageway will be aggregated to obtain the total flow. The traffic data will be adjusted to equate to the 18-hour flow.

## IMPACT SIGNIFICANCE

### Predicting the Change in the Noise Levels

43. The same methodology used to predict the baseline noise levels will be used to predict the noise levels at the sensitive receptors when the Scheme comes into full operation (operational traffic noise level) in 2020.
44. The impact study will consider the scale of predicted change in the baseline noise levels ( $L_{10}$  (18-hr) dB(A) value), with reference to the guidance set out in DMRB, Part 7, for the classification of magnitude of noise impacts in the short term (when a project is first opened). Accordingly, the significance criteria outlined in **Table 2** will be used to assess the significance of the change in noise levels at the sensitive receptors arising from traffic generated by the Scheme when it comes into full operation in 2020.

**Table 2: Impact Significance Criteria**

Noise Change $L_{10}$ (18-hr) dB(A)	Magnitude
0	No change
0.1 – 0.9	Negligible
1 – 2.9	Minor
3 – 4.9	Moderate
5	Major

### Predicting the Noise Exposure Levels

45. As described above, the impact study will consider the predicted change in the  $L_{10}$

(18-hr) dB(A) baseline noise levels. However, and in accordance with the guidance in DEFRA's *Method for Converting the UK Road Traffic Noise Index  $L_{10, 18h}$  to the EU Noise Indices for Road Noise Mapping*, the  $L_{10}$  (18-hour) value will be converted to also report the  $L_{den}$  value at the sensitive receptors when the Scheme comes into full operation in 2020.

46. The  $L_{den}$  is the primary noise indicator in the EU noise indices of annoyance from long-term exposure to noise (reflecting the day-evening-night level)<sup>25</sup>. The  $L_{den}$  indicator is applied to noise mapping exposure assessments beginning at 55 dB.

## **MITIGATION**

47. Having regard to the impact significance, the report will include recommended remedial action and mitigation measures to be implemented in order to reduce noise impacts arising from traffic generated by the Scheme when it comes into operation.

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<sup>25</sup> OJ L189, 18, 07, 2002 Directive 2002/49/EC, relating to the assessment and management of environmental noise.