

Report No. 210702

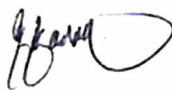
**Electromagnetic Field Exposure Assessment of the Proposed Child Care Centre at
the Drummoyne Reservoir Site**

for

Dentons Australia Limited c/o Mike & Shan Pty Ltd
77 Castlereagh Street Sydney, NSW 2000

Geoffrey Garrett
BE (Elect) Hons.

Signed:



29th July 2021

Signatory of NATA Accredited Reports

Accredited for compliance with ISO/IEC 17025 (2017) - Testing

*The tests, calibrations or measurements covered by this document
are traceable to national standards of measurements.*

The predictions, comments and conclusions in this report are not covered by the terms of NATA accreditation.

This report may not be reproduced whole or in part without the permission of EMC Services Pty Ltd.

TABLE OF CONTENTS

1. INTRODUCTION	4
2. REQUIREMENTS.....	4
3. APPLICABLE HUMAN EXPOSURE REFERENCE VALUES AND LIMITS	5
3.1 REFERENCE VALUES OF EXPOSURE FOR HUMANS - POWER FREQUENCY ELECTROMAGNETIC FIELDS.....	5
3.2 HUMAN EXPOSURE LIMITS – RADIO FREQUENCY ELECTROMAGNETIC FIELDS	5
4. MEASUREMENT METHODOLOGY & ACCURACY	6
4.1 POWER FREQUENCY ELECTROMAGNETIC FIELDS.....	6
4.2 RF BROADBAND ELECTROMAGNETIC FIELDS	6
4.3 RF NARROWBAND ELECTROMAGNETIC FIELDS	7
5. RESULTS	7
6. ASSESSMENT	8
6.1 CRITERION	8
6.2 POWER FREQUENCY ELECTROMAGNETIC FIELDS.....	8
6.3 RADIO FREQUENCY ELECTROMAGNETIC FIELDS.....	8
7. CONCLUSION & RECOMMENDATION	9
7.1 HEALTH & SAFETY	9
7.2 FUTURE SURVEY	9
8. APPENDIX	10
FIGURE 1. PROPOSED DEVELOPMENT SITE FOR NEW CHILD CARE CENTRE AT DRUMMOYNE.....	14
FIGURE 2. RF ELECTRIC FIELD AND POWER FREQUENCY MAGNETIC FIELD MEASUREMENT LOCATIONS AT THE PROPOSED CHILD CARE CENTRE	15
FIGURE 3-1. RF NARROWBAND TRACE MEASUREMENT AT LOCATION D – 30 MHz TO 1 GHz IN	16
HORIZONTAL POLARIZATION	16
FIGURE 3-2. RF NARROWBAND TRACE MEASUREMENT AT LOCATION D – 30 MHz TO 1 GHz IN VERTICAL POLARIZATION	16
FIGURE 4-1. RF NARROWBAND TRACE MEASUREMENT AT LOCATION D – 1 GHz TO 18 GHz IN	17
HORIZONTAL POLARIZATION	17
FIGURE 4-2. RF NARROWBAND TRACE MEASUREMENT AT LOCATION D – 1 GHz TO 18 GHz IN	17
VERTICAL POLARIZATION.....	17
FIGURE 5. RADIOCOMMUNICATIONS / TELECOMMUNICATION SITES NEXT TO THE PROPOSED CHILD CARE CENTRE.....	18
9. GLOSSARY	20

APPLICABLE DOCUMENTS

- [1] International Commission on Non-Ionizing Radiation Protection (ICNIRP): Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1 Hz - 100 kHz). Published in: Health Physics 99(6):818-836; 2010.
- [2] RHS30 (Radiation Health Series 30), Interim Guidelines on Limits of Exposure to 50/60 Hz Electric & Magnetic Fields (1989), Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). Cancelled 2015.
- [3] IEEE Std 644 (1994) - IEEE Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields From AC Power Lines. Reaffirmed 27 March 2008.
- [4] Report of the NRPB Advisory Group on Non-Ionising Radiation. "Power Frequency Electromagnetic Fields and the Risk of Cancer" 6 March 2001.

*Note: * The finding by the UK NRPB is of a possible doubling of the risk of leukaemia in children when exposed to a power frequency magnetic field of greater than 0.4 microtesla. The NRPB (Doll) report concluded that from a review of studies conducted in a residential environment "the possibility remains that high and prolonged time-weighted average exposure to power frequency magnetic fields can increase the risk of leukaemia in children". The report considered studies based on residential exposure. This finding has yet to be scientifically replicated and cause and effect established.*

- [5] RPS3 (Radiation Protection Standard 3), Maximum Exposure Levels to Radio-Frequency Fields – 3 kHz to 300 GHz (2002), National Health and Medical Research Council.
- [6] AS/NZS 2772.2:2016 + Amt:2018 - Principles and methods of measurement – Radio frequency fields 3 kHz to 300 GHz.
- [7] AS 2344:2016: Limits of electromagnetic interference from overhead A.C. powerlines and high voltage equipment installations in frequency range 0.15 MHz to 3000 MHz, 2016.

1. INTRODUCTION

A new child care centre facility is been planned to be located in a 5 storey building redevelopment of the Drummoyne Water Reservoir structure (The Reservoir) and the development of a separate 2 storey building (The Annex), at the corner of Rawson Avenue and South Street, Drummoyne, NSW.

An electromagnetic field exposure assessment report is required by the City of Canada Bay council for assuring health and safety of occupants within the proposed child care centre development.

The electromagnetic field impact to the proposed child care centre will be assessed due to the power-frequency and radio-frequency emissions within the development site. Compliance with the relevant OH&S standards and requirements will be determined, and a NATA accredited report provided.

An electromagnetic field survey was conducted at the proposed child care centre site to investigate the health and safety exposure concerns, and to assess the electromagnetic field environment. Compliance with the relevant OH&S standards / requirements will be determined. This report includes the measurement results of the survey, assesses the impact of the electromagnetic field emissions, assesses for compliance and provides a recommendation.

2. REQUIREMENTS

The requirements of the electromagnetic field exposure assessment are described in the points below:

- 1) Review the provided information for electromagnetic field issues.
- 2) Measure at the site of the building to be constructed, the EMF and EMR levels, at varying height from ground level to the rooftop play area.
- 3) The EMF measurements will be performed using IEEE 644 methodology, as applicable, of the power-frequency magnetic field strengths, within a bandwidth of 5 Hz to 32 kHz.
- 4) Accumulative RF Broadband measurements of the EMR levels in a bandwidth of 100 kHz to 3 GHz will be recorded, and in a bandwidth of 10 MHz to 60 GHz will be recorded.
- 5) RF narrowband measurements containing magnitude and frequency information will be recorded.
- 6) Establish the margin of compliance of the measured and/or predicted emissions, with the relevant Australian exposure standards and guidelines, ARPANSA RPS3 and the ICNIRP guideline.
- 7) A recommendation and/or an outline of a plan to mitigate any electromagnetic field non-compliance issues.



3. APPLICABLE HUMAN EXPOSURE REFERENCE VALUES AND LIMITS

3.1 Reference Values of Exposure for Humans - Power Frequency Electromagnetic Fields

Recently an ICNIRP (International Commission on Non-Ionizing Radiation Protection) guideline [1] has replaced ARPANSA RHS 30 [2], and the power frequency electric and magnetic field exposure reference values set by ICNIRP applicable to human health are summarized in the table below:

Table 1. Reference Values of Human Exposure to 50/60 Hz Time-Varying Electric & Magnetic Fields

Exposure Type	Applicable Standard	Electric Field (kV/m rms)	Magnetic Field (μ T rms)
Occupational (adequately inducted to access exposure area for whole working day)	ICNIRP	10	1000
General Public (up to 24hrs per day)	ICNIRP	5	200

Note: The Radiation Health Committee (RHC) agreed at its 24 June 2015 meeting that it would withdraw the existing National Health & Medical Research Council 's (NHMRC's) RHS 30 guideline on Extra Low Frequency (ELF) exposure. The International Commission on Non-Ionizing Radiation Protection (ICNIRP) has issued Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1 Hz -100 kHz) which are aimed at preventing the established health effects resulting from exposure to ELF EMF. The ICNIRP ELF guidelines are consistent with ARPANSA's and the RHC's understanding of the scientific basis for the protection of people from exposure to ELF EMF.

3.2 Human Exposure Limits – Radio Frequency Electromagnetic Fields

In February 1999 the Australian Communications Authority (ACA) mandated the limits of AS/NZS2772.1(Int) 1998. These limits were replaced on the 1st March 2003 by those of a new Standard RPS3, that was published by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). For regulatory purposes, the new limits became effective from the 1st June 2003.

The ARPANSA RPS3 human exposure limits [5], applicable to electromagnetic radiation, are summarized in the table below:

Table 2. Time Averaged Human Limits of Exposure – 100 kHz to 300 GHz Electric & Magnetic Fields

Exposure Activity	Frequency Range	Electric Field Strength (V/m rms)	Magnetic Field Strength (A/m rms)	Equivalent Plane Wave Power Flux Density (W/m ²)
Occupational (whole working day)	100kHz-1MHz	614	1.63/f	-
	1MHz-10MHz	614/f	1.63/f	1000/f ² (1)
	10MHz-400MHz	61.4	0.163	10 (1)
	400MHz-2GHz	3.07√f	0.00814√f	f/40
	2GHz-300GHz	137	0.364	50
General Public (up to 24hrs per day)	100kHz-150kHz	86.6	4.86	-
	150kHz-1MHz	86.6	0.729/f	-
	1MHz-10MHz	86.6/√f	0.729/f	-
	10MHz-400MHz	27.4	0.0729	2 (1)
	400MHz-2GHz	1.37√f	0.00364√f	f/200
	2GHz-300GHz	61.4	0.163	10

Note: 1. In the near field, both electric field and magnetic field limits are applicable rather than power flux density, which is applicable in the far field.
2. f is the frequency in MHz.

4. MEASUREMENT METHODOLOGY & ACCURACY

4.1 Power Frequency Electromagnetic Fields

The magnetic field measurements were performed using IEEE Std 644 (1994) [3] methodology, as applicable.

The measurement duration was determined by the time required to obtain a stable repeatable reading indicative of the true rms value at that time.

Measurements were performed at 1 m above ground level (AGL) unless otherwise specified.

All magnetic fields measured are true root mean square (rms) values of the resultant (from the X, Y & Z planes) and recorded in a 5 Hz to 32 kHz bandwidth.

The uncertainty of the measurements performed is typically ± 3 decibels (dB) for magnetic fields, with a coverage factor of 2.0 and 95% of confidence level.

The calibration of the electromagnetic field analyser (EMC Services Plant No. 24) was current.

4.2 RF Broadband Electromagnetic Fields

An Electromagnetic Radiation Meter (plant no. 22) with a 100 kHz to 3 GHz and a 10 MHz to 60 GHz E-field Probes (plant nos. 22a and 22b), was used for the broadband measurements. The broadband measurements are recorded from 100 kHz to 3 GHz and 10 MHz to 60 GHz and provide magnitude only information.

Measurements were performed at 1.5 m AGL unless otherwise specified.



The RF broadband electric field measurements from 100 kHz to 60 GHz were performed using AS/NZS 2772.2:2016 Amt 2018 methodology [6].

The uncertainty of the electric field power flux density measurements performed was ± 5 dB, with a coverage factor of 2.0 and 95% confidence level. The calibration of the measurement equipment was current.

4.3 RF Narrowband Electromagnetic Fields

The RF narrowband spectrum measurements from 30 MHz to 1 GHz and 1 GHz to 18 GHz were performed using AS/NZS 2772.2:2016 Amt 2018 methodology [6]. These measurements have been performed using peak detectors.

The main equipment used for taking the narrowband measurements included, a 30 MHz – 1 GHz bi-conical antenna (plant no. 83), a 1 - 18 GHz broadband horn antenna (plant no. 29 and a 100 Hz – 26 GHz spectrum analyser (plant no. 59a).

The uncertainty of the electric field narrowband measurements performed was ± 3 dB, with a coverage factor of 2.0 and 95% of confidence level. All correction factors are accounted for in the measurement results. The calibration of the measurement equipment was current.

Measurements are peak hold detector values performed at 1.5 m AGL unless otherwise specified.

5. RESULTS

The electromagnetic field survey was conducted around the existing water reservoir and adjacent area which is the site of the proposed child care centre, at the corner of Rawson Avenue and South Street, Drummoyne, from 10:00am to 5:00pm on Monday 19 July, and 10:00am to 12:00pm on Tuesday 20 July 2021. The weather was fine with a temperature around 18°C. The test officers were Geoff Garrett and Michael Matevski.

Measurements of broadband RF electromagnetic fields within the site, at 1.5 m above ground level (AGL) at the locations shown in Figure 2 and Table 3, and at heights from 4.8 m up to 19.2 m AGL at locations A, B and C shown in Figure 2, were conducted in the morning and afternoon. A maximum field level of 0.0817 W/m² at 1.5 m AGL was recorded at location 31 which is close to other existing buildings, and of 0.007 W/m² at 9.6 m AGL was recorded at location B at the north-western side of the property. An antenna mast was employed to raise the RF field meter and probe at locations A, B and C to a height of up to 9.6 m AGL which is approximately the level 3 floor height of The Reservoir building, and by using an elevated work platform vehicle with a 24 m high telescopic tower, measurements at greater height up to 19.2 m AGL which is approximately the level 5 floor height of The Reservoir building were performed. The measurement results for these locations are recorded in Table 3 of the Appendix.

The measurements of the power frequency electromagnetic fields were taken within the development site between 8:30am to 1pm, on Monday 19 July 2021. These measurement results at all locations shown in Figure 2 are recorded in Table 4.

Narrowband RF trace measurements for assessing the RF electric field levels at frequencies from 30 MHz to 1 GHz and 1 GHz to 18 GHz, were performed at location D for capturing RF emissions in the general area, on Tuesday 20 July 2021. These narrowband RF trace measurement results are shown in Figures 3-1 to 4-2.

According to the ACMA Register of Radiocommunications Licences, the locations of the nearby sites which contain telecommunication transmitters are shown in Figure 5. About 250 m away from the development site, there is a Telstra mobile phone base station tower at Lyon Road, with numerous mobile phone base stations with transmit antennas operating within the frequency range 725 MHz to 3.605 GHz.

6. ASSESSMENT

6.1 Criterion

The assessment of compliance of the measurements, with standards limits or guideline reference values, excludes the tolerance/s due to the measurement uncertainties given in Section 4.

6.2 Power Frequency Electromagnetic Fields

The power frequency magnetic field levels measured are consistently low within the development site, with the measured maximum being 0.2626 μT at location 36 at the northern corner of the development site (refer Table 4). This field level is well below the ICNIRP Guideline reference value of 200 μT applicable to general public exposure (refer Table 1) that ARPANSA has adopted.

Although the present guideline reference values are relatively high, long-term exposure to a magnetic field level of 0.4 μT or more, is regarded by some experts to be associated with an increase in the number of recorded cases of childhood leukemia; the UK National Radiological Protection Board (NRPB) Advisory Group on Non-Ionising Radiation (AGNIR) reported their research findings in relation to this in 2001 [4]. However, as these research findings, of the UK NRPB are yet to be proven or adopted in standards, they currently only suggest that quasi-continuous exposure to low level power frequency magnetic fields, may increase the risk of leukemia in children.

As indicated in the ICNIRP guideline [1], a number of epidemiological studies have consistently found that everyday chronic low-intensity power frequency magnetic field exposure (to levels above 0.3–0.4 μT) is associated with an increased risk of childhood leukemia. The International Agency for Research on Cancer (IARC) has classified such fields as possibly carcinogenic. However, a causal relationship between magnetic fields and childhood leukemia has not been established nor have any other long term effects been established. The absence of established causality means that this effect cannot be addressed in the ICNIRP basic restrictions (i.e. by limiting exposure within the field levels of Table 1).

As shown in Table 4, the measured maximum power-frequency magnetic field level within the proposed child care centre, is below the quasi-continuous precautionary reference value of 0.4 μT .

6.3 Radio Frequency Electromagnetic Fields

The RF broadband emission levels were measured at various locations within the proposed child care centre, corresponding to a maximum average power density in these areas of less than 4.1% in the grounds at 1.5 m AGL and 0.35% at height at 9.6 m AGL of the ARPANSA RPS3 exposure limit applicable to the General Public (refer Tables 2 and 3). There were no significant fluctuations measured during the survey.

Looking at the narrowband measurements shown in Figures 3-1 to 4-2, which were conducted at location D where representing the general area of the new child care centre, the radio broadcast and mobile phone base station communication emissions in the area are confirmed to be low and are mainly at frequencies in the vicinity of 95.2 MHz, 107.7 MHz, 725 MHz, 870 MHz, 950 MHz, 1.86 GHz, 2.1 GHz, 2.6 GHz and 3.605 GHz. The main emissions were due to the FM radio and digital TV broadcasts over the greater area from the broadcast towers at Willoughby, Artarmon and Gore Hill.

According to the ACMA Register of Radiocommunications Licences, Telstra holds a licence for the operation of 5 G mobile phone base station transmitting equipment at Lyon Road. These antennas are Ericsson model Air 6468 B42 5G antennas and will operate at 3.605 GHz with up to 200 Watts (W) output power.



7. CONCLUSION & RECOMMENDATION

7.1 Health & Safety

At the proposed child care centre at the corner of Rawson Avenue and South Street, Drummoyne, the measured power-frequency magnetic field levels are well below the ICNIRP guideline reference value of 200 μ T applicable to the general public that has been adopted by ARPANSA. Therefore, there should be no concern of risk to the health and safety of the general public or occupational personnel due to the power-frequency magnetic fields.

As the measured and maximum predicted power-frequency magnetic fields are significantly below the precautionary reference value of 0.4 μ T [1][4] applicable to the health of infants and children, precautionary mitigation of power-frequency magnetic fields is not recommended.

Within the site of the proposed child care centre, the measured radio-frequency electric fields are well below the ARPANSA RPS3 exposure limits applicable to the general public, so there should be no concern of risk to the health and safety of occupants within the proposed child care centre due to the radio-frequency electric field emissions there.

7.2 Future Survey

Should there be significant change to the electromagnetic field environment at the proposed child care centre such as due to change of the nearby mobile phone base stations, or installation of new electricity power substations nearby the child care centre then it is recommended to have the electromagnetic field environment re-assessed for health & safety and interference compliance and assurance.

8. APPENDIX

Table 3 – Broadband RF Measurements (9:00am - 5:00pm 19/7/2021)

Measurement Location		Measured Maximum Average Electric Field Power Density (100 kHz – 3 GHz) BW (1) (2) W/m ²	Measured Maximum Average Electric Field Power Density (10 MHz – 60 GHz) BW (1) (2) W/m ²	Calculated Maximum Power Density Exposure - % of ARPANSA RPS3 General Public Limit in (10 MHz – 60 GHz) BW or (100 kHz – 3 GHz) BW (3)
Location No. (5) (refer Figure 2)	Height m (AGL) (4)			
1	1.5	0.0012	0.0030	0.06
4	1.5	0.0017	0.0114	0.09
6	1.5	0.0093	0.0006	0.47
13	1.5	0.0020	0.0001	0.10
16	1.5	0.0090	0.0012	0.45
18	1.5	0.0074	0.0068	0.37
31	1.5	0.0817	0.0045	4.09
33	1.5	0.0180	0.0005	0.90
35	1.5	0.0044	0.0036	0.22
A (3:45pm, 19/7/2021)	4.8	0.0036	0.0029	0.18
	5.2	0.0011	0.0012	0.06
	8.0	0.0025	0.0029	0.13
	9.6	0.0031	0.0032	0.16
A (9:00am, 19/7/2021)	12.8	0.0028	0.0029	0.14
	16.0	0.0021	0.0020	0.11
	19.2	0.0026	0.0024	0.13
B (4:30pm, 19/7/2021)	4.8	0.0063	0.0042	0.32
	5.2	0.0012	0.0023	0.06
	8.0	0.0029	0.0042	0.15
	9.6	0.0069	0.0070	0.35
B (9:30am, 19/7/2021)	12.8	0.0058	0.0053	0.29
	16.0	0.0045	0.0043	0.23
	19.2	0.0056	0.0053	0.28
C (5:00pm, 19/7/2021)	4.8	0.0006	0.0009	0.03
	5.2	0.0012	0.0006	0.06
	8.0	0.0001	0.0016	0.01
	9.6	0.0008	0.0009	0.04
C (10:00am, 19/7/2021)	12.8	0.0010	0.0010	0.05
	16.0	0.0009	0.0008	0.05
	19.2	0.0011	0.0010	0.06

Note:

1. "Watts per square Metre" – W/m² are the International (SI) and legal units of power flux density.
2. Time-averaged measurement.
3. Accumulative of the measured electric field expressed in power density as a percentage of the 2 W/m² limit in Table 2 (i.e. minimum limit within the frequency band).

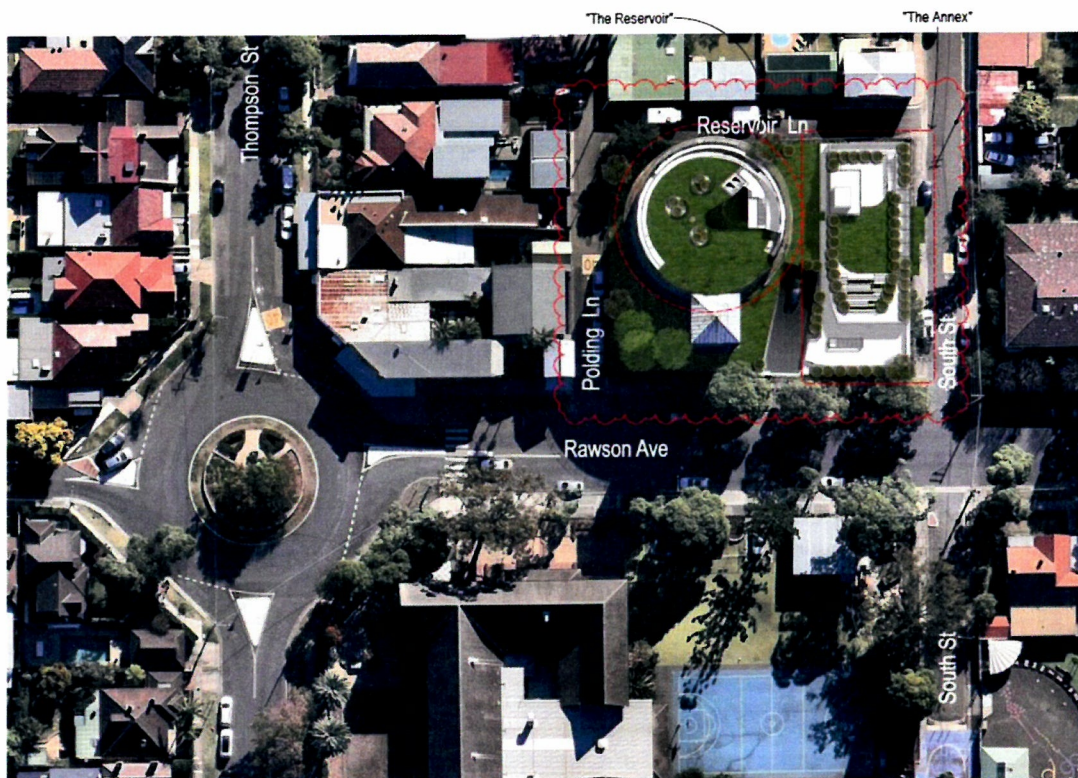
4. *Measurements at Locations A to C are recorded at a heights of 4.8 m, 9.6 m, 12.8 m, 16 m & 19.2 m AGL (1 m AFL on L2, L3, L4, L5 & Roof Garden of The Reservoir building respectively), and at heights of 5.2 m & 8.0 m AGL (1 m AFL on L2 & L3 of The Annex building respectively), which are the mean heights of body mass on the respective floor areas..*
5. *Measurements at Locations 1 to 35 were performed from 10:30am to 11:30am on 19/7/2021.*

Table 4 – Measured Power Frequency Magnetic Fields (11:30am - 1:00pm 19/7/2021)

Measurement Locations (refer Figure 2)	Comments	Measured Maximum Average Magnetic Field (5 Hz – 32 kHz) (μ T rms)
1	Next to Polding Lane	0.042
2	Next to Polding Lane	0.066
3	Next to Polding Lane	0.067
4	Next to Polding Lane	0.083
5	Next to Polding Lane	0.060
6	Next to Polding Lane	0.111
7	Next to Reservoir Lane	0.049
8	Within Reservoir	0.048
9	Within Reservoir	0.041
10	Within Reservoir	0.053
11	Next to Reservoir Tower	0.064
12	Next to Concrete path	0.087
13	Next to Reservoir Lane	0.052
14	Within Reservoir	0.047
15	Within Reservoir	0.029
16	Within Reservoir	0.051
17	Next to Reservoir Tower	0.067
18	Next to Concrete path	0.081
19	Next to Reservoir Lane	0.073
20	Next to Reservoir Tower	0.071
21	Next to Reservoir Tower	0.067
22	Next to Reservoir Tower	0.064
23	Between Reservoir and the new Building	0.082
24	Next to Concrete path	0.124
25	Next to Reservoir Lane	0.103
26	Bitumen driveway	0.103
27	Bitumen driveway	0.097
28	Bitumen driveway	0.083
29	Bitumen driveway	0.082
30	Next to Concrete path	0.153
31	Next to Reservoir Lane	0.187
32	At the location of new Building	0.141
33	At the location of new Building	0.116
34	At the location of new Building	0.097
35	Next to Concrete path	0.115
36	Next to South Street	0.262
37	Next to South Street	0.220
38	Next to South Street	0.214
39	Next to South Street	0.230
40	Next to Concrete path	0.197

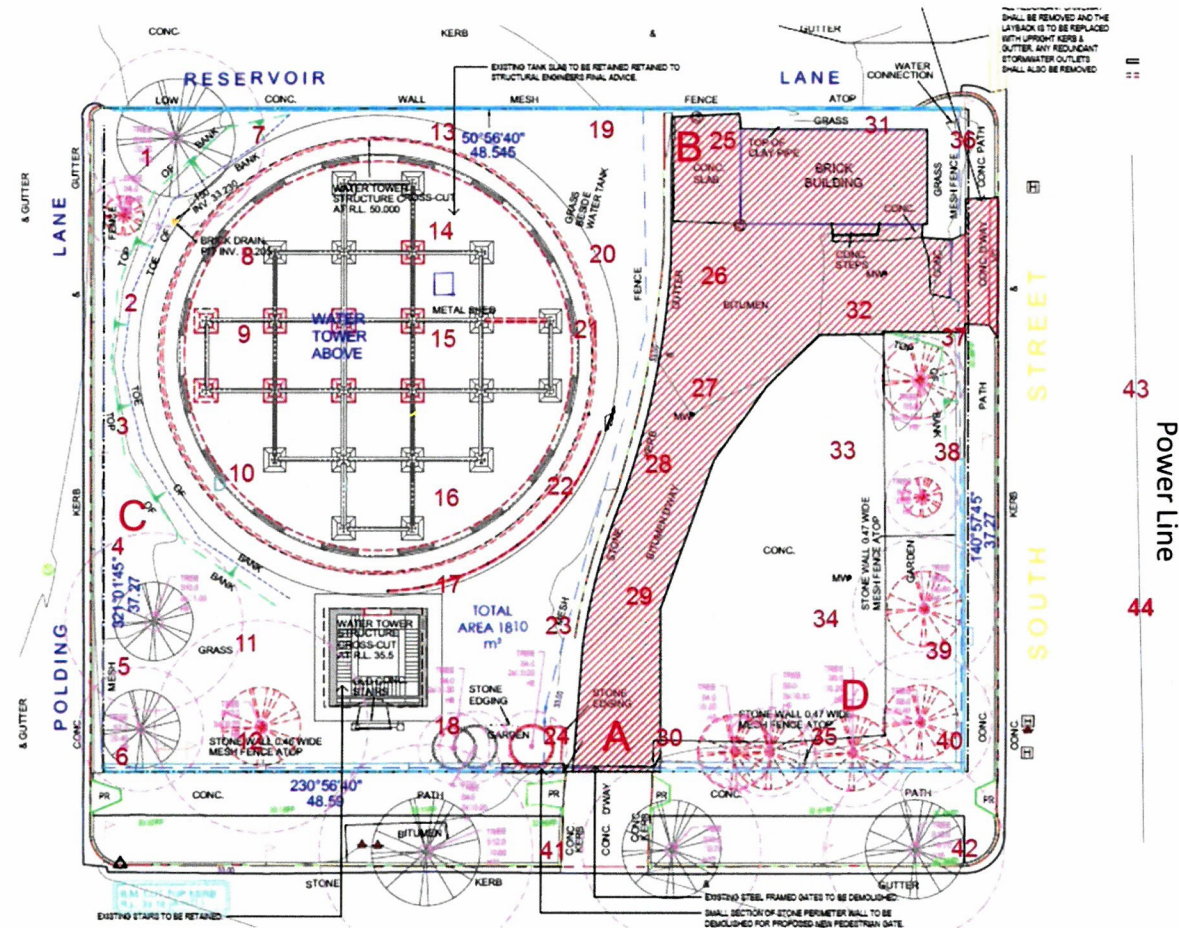
Measurement Locations (refer Figure 2)	Comments	Measured Maximum Average Magnetic Field (5 Hz – 32 kHz) (μ T rms)
41	Next to Concrete path	0.164
42	Next to Concrete path	0.180
43	Under power line located northern side of South Street	0.394
44	Under power line located northern side of South Street	0.220
45	At existing Drummoyne Public School	0.486

Figure 1. Artistic Impression of the Proposed Child Care Centre - Top View



Note: 1. This figure is from an original drawing provided by Dentons, that has been copied for illustration purposes only, and is not to scale.

Figure 2. RF Electric Field and Power Frequency Magnetic Field Measurement Locations at the Proposed Child Care Centre



Note: 1. This figure is based on an original drawing provided by Dentons, that has been copied and marked-up for illustration purposes only, and is not to scale.

Figure 3-1. RF Narrowband Trace Measurement at Location D – 30 MHz to 1 GHz in Horizontal Polarization

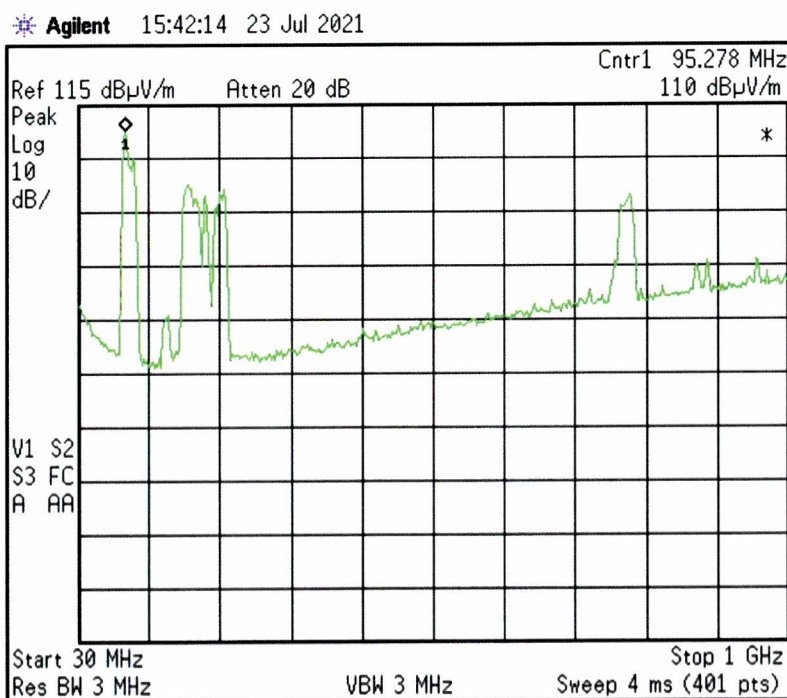


Figure 3-2. RF Narrowband Trace Measurement at Location D – 30 MHz to 1 GHz in Vertical Polarization

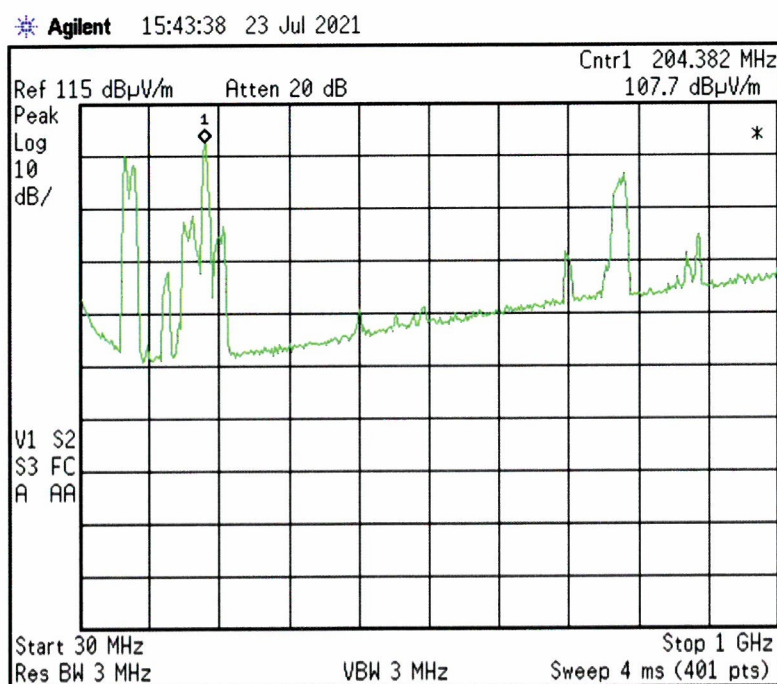


Figure 4-1. RF Narrowband Trace Measurement at Location D – 1 GHz to 18 GHz in Horizontal Polarization

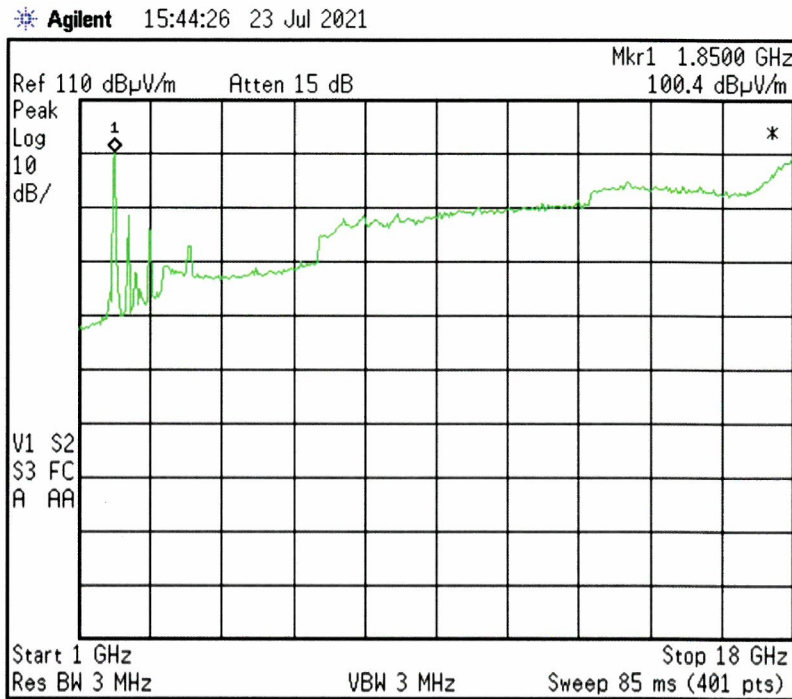


Figure 4-2. RF Narrowband Trace Measurement at Location D – 1 GHz to 18 GHz in Vertical Polarization

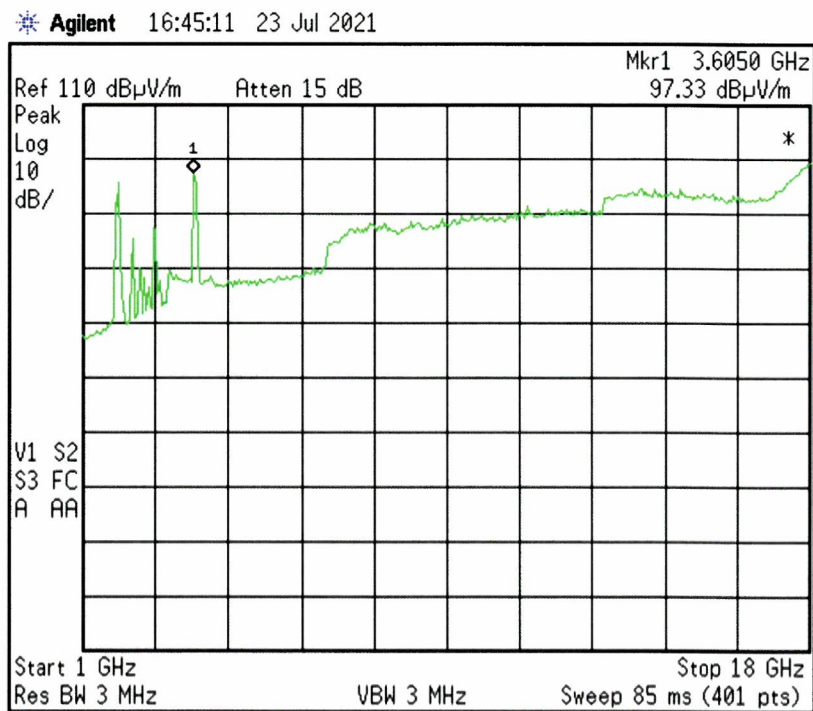
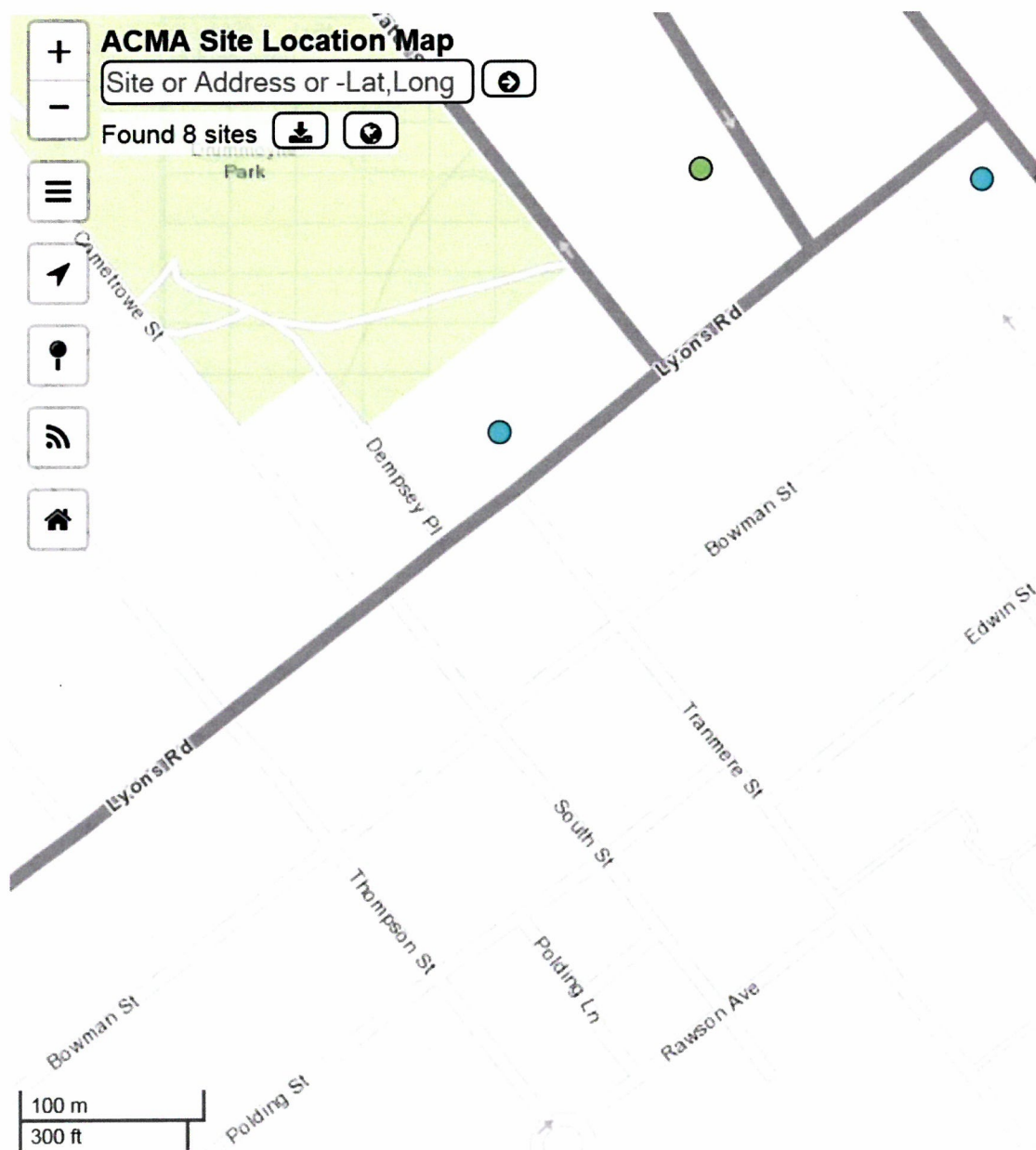


Figure 5. ACMA Register of Radiocommunications / Telecommunication Sites next to the Proposed Child Care Centre



Note: Blue dots are active sites, and green dots are inactive sites.

Photo 1. Site of the Proposed Child Care Centre – View from South Street



9. GLOSSARY

Broadband	In the context of an RF measurement, a broadband measurement measures the magnitude over a large (broad) frequency range. A broadband measurement is useful for providing the net magnitude of the emissions from multiple sources (eg. The combination of Radio, TV, WiFi, Mobile Phones, etc...) though does not provide the magnitude of individual frequency emissions.
Narrowband	In the context of an RF measurement, a narrowband measurement measures the magnitude over a small (narrow) frequency range. A narrowband measurement provides the magnitude of individual frequencies, and is useful for determining the emissions from the sources of interest (eg. WiFi only).
Power Frequency	A term typically used to describe mains power electromagnetic fields at 50 Hz, though extends to other frequencies such as the harmonics of 50 Hz, which may extend to approx. 3 kHz. Examples of sources that emit higher magnitudes of power-frequency electromagnetic fields include, power lines, electrical switch boards, electrical substations, electrical risers, high power electrical appliances, etc...
Radio Frequency (RF)	Radio Frequency is a term used for describing the range of oscillation of radio waves, which is generally from 3 kHz to 300 GHz. Some examples of radio waves are Radio & TV Broadcasts, Mobile Phone communications, WiFi, Bluetooth, etc..