136-142 Finchley Road, NW3 5HS

Planning noise assessment in relation to a proposed spa and gym development

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DLA Town Planning

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1. INTRODUCTION

DLA Town Planning are involved with the proposed conversion of existing commercial space at 136-142 Finchley Road, London, to a spa and gym.

The Local Planning Authority has advised that in order for an application to be registered, a plant noise impact assessment is required.

Accordingly, Spectrum Acoustic Consultants has been instructed to carry out the required noise assessment.

2. SITE DESCRIPTION AND PROPOSALS

The existing development comprises commercial uses at ground floor level with residential dwellings above. The prospective tenant of the proposed development is not currently known, and the proposed plans provided are only illustrative at this stage. Depending on the tenant, the scheme could end up being significantly different from the illustrative scheme. It is understood, however, that the proposed spa and gym would likely operate between 6am and 10pm.

The proposed scheme includes some internal plant areas to the front and rear, which would be ventilated by louvres in the façade.

Drawings of the existing and proposed schemes are presented in Appendix A.

3. RELEVANT GUIDANCE

3.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The National Planning Policy Framework (NPPF) was first published in March 2012 and revised in July 2018 and again in February 2019[1]. It sets out the Government's planning policies for England and how these should be applied by establishing a framework within which locally prepared plans for development can be produced.

NPPF requires (170) that "*planning policies and decisions should contribute to and enhance the natural and local environment by: (…..) preventing new and existing development from contribution to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of (…..) noise pollution.*

In relation to noise (180) '*Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life[2];

[1] *National Planning Policy Framework, MHCLG, February 2019*

[2] *See Explanatory Note to the Noise Policy Statement for England, paragraphs 2.23 and 2.24, DEFRA,15 March 2010).*

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason'

Planning policies and decisions should also (182) *'ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed'.*

Throughout the NPPF reference is made to other policies, such as the Noise Policy Statement for England (NPSE), which should also be applied as appropriate.

3.2 NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

The Noise Policy Statement for England (NPSE)[3] sets out the long term vision of government noise policy which is to *'Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.'*

The aims of the NPSE are to (2.23-2.25):

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life

These aims are developed by reference (2.20-2.21) to the concepts of:

- NOEL (No Observed Effect Level). This is the level below which no effect can be detected.
- LOAEL (Lowest Observed Adverse Effect Level). This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL (Significant Observed Adverse Effect Level). This is the level above which significant adverse effects on health and quality of life occur.

It recognises that there is no universally applicable objective threshold for these concepts. Consequently, the NOEL, LOAEL and SOAEL are likely to be different for different noise sources and receptors and at different times (2.22).

Situations of significant adverse effect (SOAEL) should be avoided (2.23). Where the impact is between LOAEL and SOAEL reasonable steps should be taken to minimise and mitigate adverse effects on health and quality of life, but does not mean that such adverse effects cannot occur (2.24). It is also implied that situations of NOEL would be acceptable in noise terms.

[3] *Noise Policy Statement for England (NPSE), DEFRA, 15 March 2010*

3.3 PLANNING PRACTICE GUIDANCE

In March, 2014, Planning Practice Guidance on Noise[4] (PPG-N) was released. This provides advice on '*how planning can manage potential noise impacts in new development'*.

It confirms that neither the NPSE[5] nor the NPPF[6] *'expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of proposed development' (002).*

It also details the hierarchy of noise exposure, including the thresholds LOAEL and SOAEL, based on the likely average response, referred to within NPSE[7]. The noise exposure categories are summarised below.

- No Observed Adverse Effect: noise can be heard but does not cause any change in behaviour or attitude.
- Observed Adverse Effect: noise can be heard and causes small changes in behaviour and/or attitude.
- Significant Observed Adverse Effect: noise causes a material change in behaviour and/or attitude.
- Unacceptable Adverse Effect: extensive and regular changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or psychological effects.

The guidance advises, in accordance with the first and second aims of the NPSE, that where there is no observed effect or no observed adverse effect, no specific measures are required to manage the acoustic environment; where there is an observed adverse effect, consideration needs to be given to mitigating and minimising those effects; where there is significant adverse effects, the planning process should be used to avoid these effects occurring; where there are unacceptable adverse effects, the situation should be prevented.

In establishing values for LOAELs and SOAELs which represent the onset levels of adverse effects and significant adverse effects respectively, the guidance advises because of the subjective nature of noise, there is no simple relationship between noise level and its impact. It will instead depend on a number of factors in a particular situation. These will include:

- *'The source, its absolute level and the time of day.*
- *For intermittent sources, the number and duration of events;*
- *The spectral frequency content of the noise*

And also other factors will need to be considered in many cases, which are more fully described and detailed within the full PPG guidance, but include matters such as:

- *The cumulative impacts with other sources*
- *Whether internal effects can be completely removed for example by closing windows (relevant with new residential development subject to ventilation being developed)*

[4] *PPG - Noise, MHCLG, 6 March 2014*
[5] *Explanatory Note to the Noise Policy Statement for England*, *paragraphs 2.23 and 2.24 , DEFRA,15 March 2010)*
[6] *National Planning Policy Framework, MHCLG, July 2018*
[7] *Explanatory Note to the Noise Policy Statement for England*, *paragraphs 2.19 and 2.20 , DEFRA,15 March 2010)*

- *Whether existing noise sensitive locations already experience high noise levels,*
- *Where Noise Action Plans, and, in particular Important Areas are identified nearby.*
- *The effect on fauna/wildlife especially on nationally designated sites.*
- *The use of external amenity spaces intrinsic to an overall design and including private gardens.*
- *The potential effect of a new residential or other sensitive development being located close to an existing noisy business or site, and for noise mitigation to be considered.*
- *Whether there are nearby areas of tranquility relatively undisturbed by noise from human caused sources that undermine the intrinsic character of the area and likely already valued for their tranquility.'*

It should be observed that the PPG guidance does not provide any detail on the how such assessment including these factors, should be carried out. Reference is generally therefore made to existing British Standards where possible and also to scientific exposure-response studies or reviews relating to noise and its health and other effects on human and, where appropriate, animal populations. In such circumstances, some justification may be necessary when using this information.

3.4 BS 4142:2014 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND

The principle of BS 4142[8] is to determine an initial estimate of impact of industrial/commercial sound on nearby residents by comparing the Rating Level (sound level from the industrial/commercial source, with a correction applied for any acoustic features that characterise the sound) with the Background Sound Level (L_{A90} as measured in absence of the industrial/commercial source).

Generally, the greater the difference by which the Rating Level exceeds the Background Sound Level, the greater the magnitude of impact. BS 4142 states that *'a difference of around +10 dB or more is likely to be an indication of a significant adverse impact […]. A difference of around +5 dB is likely to be an indication of an adverse impact […]. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.'*

However, BS 4142 also advises that '*when making assessments and arriving at decisions […] it is essential to place the sound in context'* so in each case, the context in which the sound is placed must be considered and the initial estimate of impact should be modified accordingly. For example, it advises '*Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night*.' It also indicates that impacts estimated during '*the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes.*'

4. BACKGROUND SOUND LEVELS AFFECTING THE SITE

To inform the noise assessment, the background sound levels affecting the proposed development site must first be determined. Typically, this is done by carrying out a noise measurement survey at the site.

A review of the site and surrounding uses indicates that the main noise sources affecting the site will be from road traffic, predominantly from Finchley Road.

[8] *BS 4142:2014 Methods for rating and assessing industrial and commercial sound*

As a result of the current Coronavirus lockdown, it would not be possible to carry out a noise measurement survey that is representative of the typical noise environment, as there will be significantly reduced road traffic in the area. However, there is often a good deal of historical information available from which typical ambient noise levels can be determined, such as:

- road traffic count data from the Department of Transport (DfT);
- England's road and rail noise maps presented on Extrium.co.uk;
- noise survey data from recent nearby planning applications; and
- Spectrum's detailed experience of noise in other similar environments.

4.1 REVIEW OF RECENT NEARBY NOISE SURVEY DATA

A review has been carried out of the most relevant and recent nearby noise measurement surveys carried out to support other planning applications on Finchley Road, which are available for review on Camden Council's planning portal. The background sound level survey results of each are summarised in Table 1. The levels presented are the linear average $L_{A90,T}$ levels.

Address	Description of measurement location	Year	$L_{A90,T}$	
			Day	Night
21 Northways Parade	Rear. Screened from roads. Between Finchley Road and College Cres.	2019	48	44
551-557 Finchley Road	Rear. Screened from roads. Between Finchley Road and Fortune Green.	2019	46	43
309 Finchley Road	Rear. Enclosed position screened on all sides.	2014	45	41
272 Finchley Road	Rear. Screened from Finchley Road.	2014	45	35
Average	**Rear, screened measurement locations.**	**-**	**46**	**41**

Table 1: Summary of recent nearby background sound surveys

The data summarised in Table 2 shows results that are reasonably consistent, apart from perhaps the lower night time background sound level recorded at the rear of 272 Finchley Road.

The average background sound level of the combined survey results is L_{A90} 46dB during the day and L_{A90} 41dB during the night. This is considered to be representative of the background sound levels to the rear of the proposed development at 136-142 Finchley Road.

Background sound levels to the front of the proposed development will be higher, since this location is closer, and has direct line of site, to the road. No historical survey data could be found, however, that would be considered representative of this location. Instead, ambient noise levels have been calculated at the front façade based on road traffic count data from the Department of Transport (DfT).

4.2 REVIEW OF RECENT ROAD TRAFFIC COUNT DATA

Table 2 summarises the most recent historical road traffic count data available on the DfT website for Finchley Road and the calculated Basic Noise Level (BNL), as calculated in accordance with CRTN[9]. The DfT data is given as the annual average daily flow over a typical 24-hour period. CRTN's BNL calculation

[9] Department of Transport, Welsh Office (1988). Calculation of Road Traffic Noise. HMSO, London.

procedure considers flows over the 18-hour daytime period between 06:00 to 00:00. As a worst case, this assessment has taken the DfT data to be equal to the 18-hour flow.

Count point ref.	Year	Description	Annual average daily flow (total vehicles)	Percentage heavies (%)	Speed (km/h)	Basic Noise Level (BNL)
16434	2018	Finchley Road (A41)	49103	24%	50	73

Table 2: Most recent historical road traffic count data from DfT

The measurement locations for each of the data points, as presented on the DfT website, are shown in Figure 1, below.

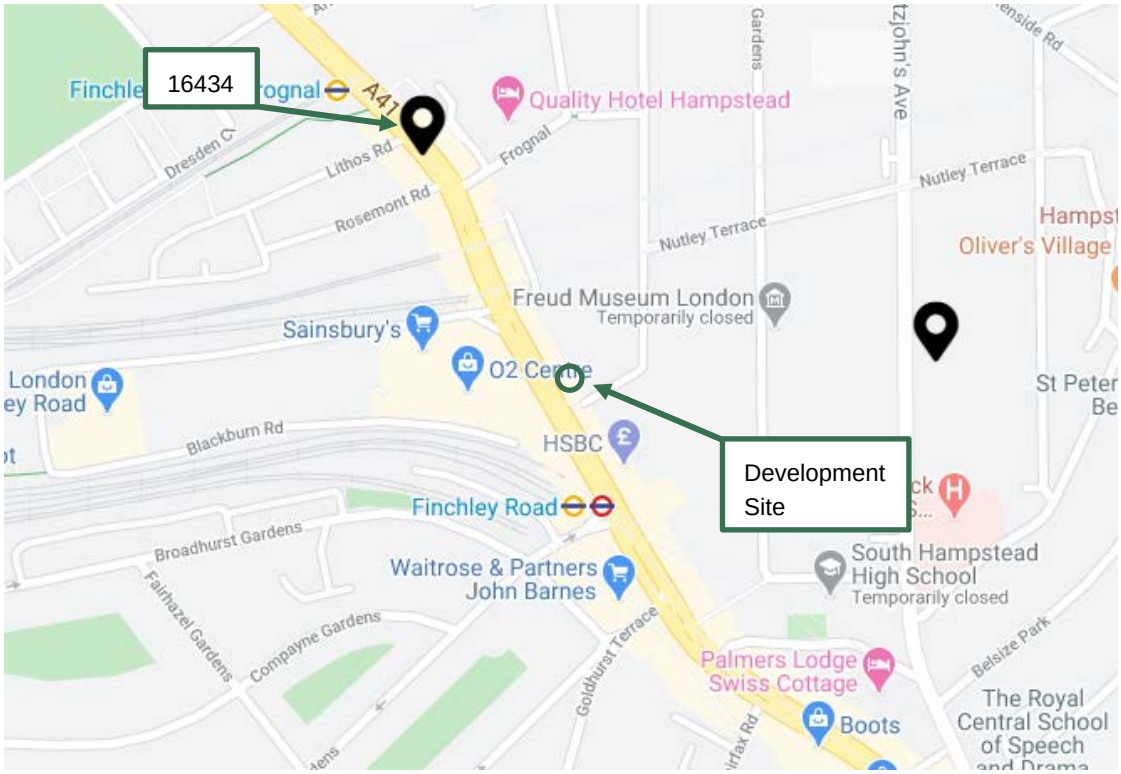

Figure 1: DfT traffic count data points

It should be noted that large changes in road traffic flows have a relatively small effect on the calculated noise level. For example, an increase in flow of 25% will typically lead to a 1dB increase in noise level and a doubling of the flow would lead to an increase of 3dB. Within this context, it is considered that the latest available traffic count data from 2018 will be representative of the existing scenario, as any growth factors present over the last 2 years are likely to have had a negligible effect on noise.

The BNL describes the noise level at 10m from the roadside edge in terms of the $L_{A10,18hr}$ metric. For the purposes of assessment under current UK Guidance and Standards, this must be converted to the $L_{Aeq,16hr}$ metric for the day (07:00-23:00) and $L_{Aeq,8hr}$ metric for the night (23:00-07:00). This assessment

applies the methodology set out by DEFRA[10] (Method 3), as advised by BS 8233, which assumes typical diurnal variations in flow over the day and night time periods. The results are summarised in Table 3.

Description	Basic Noise Level (BNL)	Daytime $L_{Aeq,16hr}$ 10m from roadside edge	Night time $L_{Aeq,8hr}$ 10m from roadside edge
Finchley Road	73	71	62

Table 3: BNL conversion to $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$ for the day and night, respectively

The ambient noise levels presented in Table 3 are considered representative of the incident noise levels at the façade of the proposed development.

Although it has not been possible to measure representative background sound levels at the front façade directly, Spectrum has detailed experience of noise in similar environments. It is considered that background sound levels at this site will be controlled by local and distant road traffic movements as well as potentially other existing plant in the area, particularly at night. Generally, where road traffic noise is the dominant source, the closer a receptor is to a road, the larger the difference between the ambient noise level (L_{Aeq}) and background sound level (L_{A90}). Close to a road with regular traffic movements, this difference might be up to around 10dB during the day. During the night, when traffic movements are minimal, this difference can increase to up to around 15dB. For distant roads with continuous traffic, this difference will be much smaller, with background sound levels (L_{A90}) typically around 2-3dB below the ambient noise level (L_{Aeq}). In screened locations, for example in rear yards or gardens that are screened from the main road source by a row of terraced houses, this difference is typically around 5-7dB.

At the proposed site, the front façade is in close proximity to Finchley Road. At this location, the background sound level is estimated to be 10dB below the daytime ambient noise level and 15dB below the night time ambient noise level. Accordingly, the background sound levels to the front façade are estimated to be L_{A90} 61dB during the day and L_{A90} 47dB during the night.

4.3 SUMMARY OF BACKGROUND SOUND LEVELS

Table 4 summarises the estimated background sound levels at the site based on the above analysis.

Description	Daytime L_{A90}	Night time L_{A90}
Front façade	61	47
Rear façade	46	41

Table 4: Estimated background sound levels at the proposed development

[10] Method for converting the UK road traffic noise index $L_{A10,18h}$ to the EU noise indices for road noise mapping (Defra 2006)

5. ASSESSMENT

5.1 NOISE IMPACT FROM PLANT

A detailed scheme proposal has not yet been developed and, therefore, a plant noise assessment cannot yet be carried out. However, plant noise limits can be advised based on the background sound levels at the site, as summarised in Section 4.3.

The Camden Local Plan 2017 advises that BS 4142 should be used for the assessment of industrial and commercial noise sources and states that *'a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion.'*

The use of the rating level in this wording, as opposed to the specific sound level, is unfortunate as it does not recognise the numerical character correction that is inherently included in the rating level, under BS 4142, where tones are present. Effectively, Camden's plan attempts to apply this tonal correction twice over.

In any case, plant associated with the proposed use will likely include water pumps, boilers and ventilation equipment, located within plant rooms with louvres for ventilation. Typically, noise from these types of combined sources breaking out of the louvres will be broadband and continuous in nature and would not, therefore, require a character correction to be applied to the specific sound level in derivation of the rating level. Therefore, it is likely that the rating level will be equal to the specific sound level.

Accordingly, Table 5 sets out the design criteria for plant noise associated with the proposed development, which would be acceptable under the Camden Local Plan.

Description	Rating Level $L_{Ar,Tr}$	
	Daytime (07:00-23:00)	Night time (23:00-07:00)
Front façade	51	37
Rear façade	36	31

Table 5: Plant noise design criteria based on Camden Local Plan

The design criteria set out in Table 5 can be used as the basis of a planning condition to allow for the mechanical plant scheme to be developed at the appropriate time according to the needs of any future tenant. It will be for the mechanical contractor to design the plant scheme such that the design criteria are achieved.

5.2 SPA AND GYM USE IMPACTS

The existing separating floor build up between the ground floor commercial space and first floor residential dwellings is unknown at this stage. However, it may be that some enhancement is required where noisy activities are expected, such as operation of plant rooms and activities within the spa and gym, potentially including music.

BS 8233:2014 provides some general guidance in relation to suitable criteria for sound insulation between various spaces, based on the activity noise level of the source room and the sensitivity and privacy requirements of the receiver room. The guideline criteria are copied in Table 6, below.

Privacy requirement	Activity noise of source room	Noise sensitivity of receiving rooms		
		Low sensitivity	Medium sensitivity	Sensitive
Confidential	Very high	47	52	57
	High	47	47	52
	Typical	47	47	47
	Low	42	42	47
Moderate	Very high	47	52	57
	High	37	42	47
	Typical	37	37	42
	Low	No rating	No rating	37
Not Private	Very high	47	52	57
	High	37	42	47
	Typical	No rating	37	42
	Low	No rating	No rating	37

Table 6: Example sound insulation matrix (dB $D_{nT,w}$) copied from BS 8233:2014

Residential dwellings are considered to be sensitive and require a confidential level of privacy.

Additionally, the Building Regulations requires a minimum sound insulation performance in new build residential developments of $D_{nT,w}+C_{tr}$ 45dB. The C_{tr} value is a correction factor to account for low frequency noise shaping, such as might be expected from road traffic or amplified music. Typical as-built C_{tr} values can be up to around -7dB, depending on the construction type, which indicates that an equivalent $D_{nT,w}$ value would be around 52dB. The kind of activity noise expected within a residential dwelling would, therefore, be considered 'high', according to the table above.

Noisy activities that might reasonably be expected in dwellings include listening to music or watching television at relatively high volumes, perhaps up to around 70-75dB(A), or raised voices, which would be expected to generate similar noise levels in habitable rooms.

Spectrum has measured noise levels in a range of operational gyms at other sites. Gyms that play background music and provide use of free weights, tread mills, running machines and resistance machines, typically have internal ambient noise levels of up to around L_{Aeq} 70dB; however, there may additionally be impulsive noise events such as with the use of running machines and occasional dropping of weights. It may be considered that the noise activity level of the proposed spa and gym is 'very high'.

It is recommended that the sound insulation performance of the separating floor between the ground floor spa and gym and first floor residential dwellings should be specified so as to achieve at least $D_{nT,w}$ 57dB and $D_{nT,w}+C_{tr}$ 50dB, which may be acceptable where gym noise levels are anticipated to be typically up to around L_{Aeq} 70-75dB.

To avoid flanking noise, it may be necessary to install an independent wall lining to the perimeter wall within the ground floor unit.

To avoid structure borne noise resulting from impacts being re-radiated into habitable rooms above, all gym equipment and free weights areas should be vibration isolated from the structural floor. This may require the installation of a sprung floor system or rubber matting, which in each case should be suitable for the proposed activity in each area.

Note that some gyms provide other activities such as spin classes, during which music levels can be very high, up to around L_{Aeq} 90dB or more, and with significant bass content. This site is unlikely to be suitable for such high music noise levels.

6. CONCLUSIONS

A noise assessment has been carried out to establish the background sound levels at the proposed site and to set plant noise limits such that the noise impact from plant will be acceptably low.

Additionally, noise from potential internal activities within the proposed spa and gym has been considered and recommended specifications for the separating floor to residential dwellings above provided.

Where the above limits and recommendations are achieved, the noise impact from the proposed spa and gym should be reduced to acceptable levels.

APPENDIX A

Proposed scheme

Site Location Plan
(Scale 1:1250 @ A3)

North

0 5m 25m 50m 100m

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client: Cherry Hill Ltd

job title: 136-142 Finchley Road proposed change of use from A1 to D2

drawing title: Location plan -

job no: 20002

drawing no: P-01 - - - - - - - - -

date: Jan 2020

scale: 1:1250

sheet size: A3

drawn: RGH

checked: RGH

Block Plan
(Scale 1:500 @ A3)

North

0 5m 25m 50m

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client: Cherry Hill Ltd

job title: 136-142 Finchley Road proposed change of use from A1 to D2

drawing title: Block plan -

job no: 20002

drawing no: P-02 - - - - - - - - -

date: Jan 2020

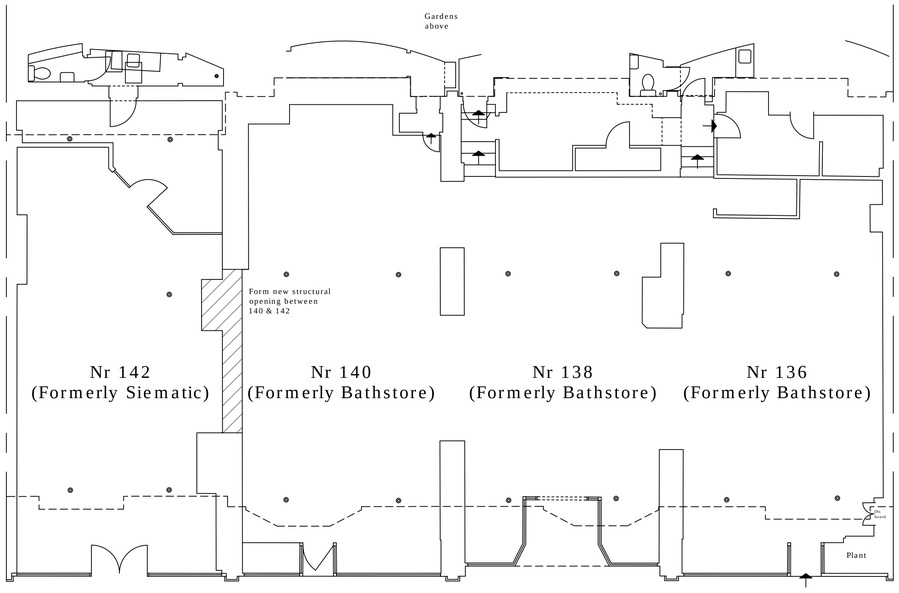
scale: 1:500

sheet size: A3

drawn: RGH

checked: RGH

Existing elevation



Existing floor plan

North

0 1m 5m 10m

RGH Architects	Friars Gap Hitchin Road Weston Hitchin Herts SG4 7AX tel +44 (0) 1462 790808 email info@rgh.uk.com web www.rgh.uk.com	drawing title	Plan and elevation as existing -
client	Cherry Hill Ltd		
job title	136-142 Finchley Road proposed change of use from A1 to D2	job no	20002
		date	Jan 2020
		drawing no	P-03
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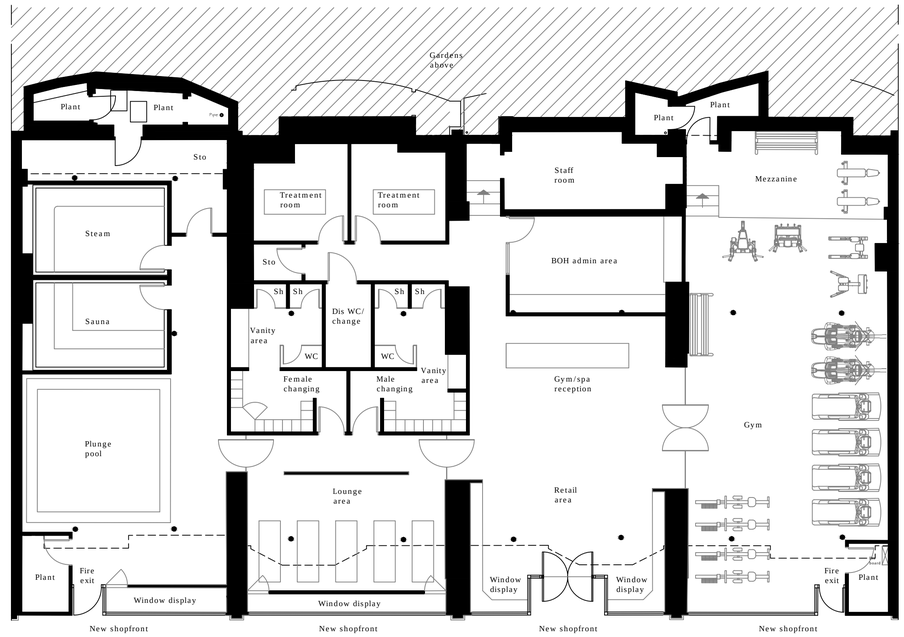
		sheet size	A1
		drawn	RGH
		checked	RGH

Proposed elevation



Proposed floor plan

Schedule of materials/finishes:

Shopfront:	Aluminium framed glazed shopfront
Louvres:	Powder coated aluminium
Signage:	Illuminated signage TBA

North

0 1m 5m 10m

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client: Cherry Hill Ltd

job title: 136-142 Finchley Road proposed change of use from A1 to D2

drawing title: Plan and elevation as proposed -

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