CampbellReith
consulting engineers

1 Spencer Rise, London, NW5 1AR

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12727-95

Revision: D1

October 2018

Campbell Reith Hill LLP
Friars Bridge Court
41-45 Blackfriars Road
London
SE1 8NZ

T:+44 (0)20 7340 1700
F:+44 (0)20 7340 1777
E:london@campbellreith.com
W:www.campbellreith.com

Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	October 2018	Comment	GKemb12727-95-231018-1 Spencer Rise-D1.docx.docx	GK	GK	EMB

Document Details

Last saved	26/10/2018 12:15
Path	GKemb12727-95-261018-1 Spencer Rise-D1.docx
Author	G Kite, BSc MSc DIC FGS
Project Partner	E M Brown, BSc MSc CGeol FGS
Project Number	12727-95
Project Name	1 Spencer Rise
Planning Reference	2018/2442/P

Contents

Appendix

1.0 NON-TECHNICAL SUMMARY

1.1. CampbellReith was instructed by London Borough of Camden, (LBC) to carry out an audit on the Basement Impact Assessment submitted as part of the Planning Submission documentation for 1 Spencer Rise, London NW5 1AR (planning reference 2018/2442/P). The basement is considered to fall within Category B as defined by the Terms of Reference.

1.2. The Audit reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development in accordance with LBC's policies and technical procedures.

1.3. CampbellReith was able to access LBC's Planning Portal and gain access to the latest revision of submitted documentation and reviewed it against an agreed audit check list.

1.4. The proposed development is to provide basement accommodation under the existing two storey terraced property with lightwells to the front and rear.

1.5. The BIA has been prepared by Ground & Water with supporting documents prepared by Vincent & Rymill. The authors' qualifications are in accordance with the requirements of CPG guidelines.

1.6. A desk study broadly in accordance with LBC guidance is presented. The location of underground infrastructure / utilities within the zone of influence should identified and impacts assessed, if applicable.

1.7. A site investigation has identified a varying thickness of Made Ground underlain by the London Clay Formation. Its noted that some soil descriptions are consistent with Head Deposits, there are no descriptions of clay stiffness and no insitu testing has been undertaken.

1.8. The ground conditions should be reviewed and insitu shear strength confirmed prior to any construction.

1.9. The monitoring data indicates that the basement development will be below standing groundwater level. The hydrogeological assessment should be reviewed following further monitoring and consideration of the ground conditions.

1.10. The BIA identified that the assumed course of the "lost" River Fleet runs approximately 30m west of the site. Comments from local residents indicate that this tributary has been culverted beneath York Rise.

1.11. The basement will be constructed utilising underpinned retaining walls and a ground bearing basement slab. Structural calculations and retaining wall design are provided for review along

with sequencing and propping information. These require revision to consider the slope across the site.

1.12. Considering the proposed form of construction, the description of soils presented and the likelihood of encountering groundwater, suitable mitigation measures to maintain stability during construction should be proposed.

1.13. A Ground Movement Assessment (GMA) is presented that considers the movements relating to the proposed basement construction and the effect on the adjacent properties. The GMA is not accepted and further assessment is required.

1.14. The GMA should additionally consider potential impacts to utilities and the retaining wall at the rear of the property. Its noted that neighbours report existing structural damage which should be confirmed and appropriate mitigation proposed, if applicable.

1.15. Structural monitoring is proposed during the construction works. The frequency of monitoring should be consistently presented within the reports and drawings.

1.16. The site is at very low risk of surface water flooding and fully under hard cover. There will be no impact to the wider hydrological environment.

1.17. Impact assessments, in relation to hydrogeology and stability, should be reviewed once the additional information required has been presented and mitigation proposed, as required.

1.18. Queries and matters requiring further information or clarification are discussed in Section 4 and summarised in Appendix 2. Until the further information required has been presented, the BIA does not meet the criteria of CPG Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 24 July 2018 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 1 Spencer Rise, London NW5 1AR, Camden Reference 2018/2442/P.

2.2. The Audit was carried out in accordance with the Terms of Reference set by LBC. It reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development.

2.3. A BIA is required for all planning applications with basements in Camden in general accordance with policies and technical procedures contained within:

- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
- Camden Planning Guidance: Basements.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.
- The Local Plan (2017): Policy A5 (Basements).

2.4. The BIA should demonstrate that schemes:

a) maintain the structural stability of the building and neighbouring properties;

b) avoid adversely affecting drainage and run off or causing other damage to the water environment; and,

c) avoid cumulative impacts upon structural stability or the water environment in the local area;

and evaluate the impacts of the proposed basement considering the issues of hydrology, hydrogeology and land stability via the process described by the GSD and to make recommendations for the detailed design.

2.5. LBC's Planning Portal describes the planning proposal as: *"Excavation of single storey basement underneath the residential building (Class C3) with front and rear closed lightwells"*.

LBC's Planning Portal confirmed that the site lies within the Dartmouth Park Conservation Area but is not a Listed Building.

2.6. CampbellReith accessed LBC's Planning Portal on 17 August 2018 and gained access to the following relevant documents for audit purposes:

- Ground Investigation and Basement Impact Assessment (ref GWPR2459/GIR/July 2018, V1.02), dated July 2018 by Ground and Water.
- Structural design, construction sequence and temporary works report dated March 2018 by Vincent & Rymill.
- Drawings by Edward Williams Architects: Plans for existing ground, first floor and roof plan, sections, elevations and a site location plan; Plans for proposed lower ground floor, ground floor, sections and elevations.
- Planning Design Access and Significance Appraisal dated May 2018 by Michael Burroughs Associates.
- Tree report dated April 2018 by Tretec.
- Comments and objections to the proposed development from local residents.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	
Is data required by Cl.233 of the GSD presented?	No	Utilities / underground infrastructure information within the zone of influence should be provided.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	
Are suitable plans/maps included?	Yes	
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Report, Section 3.1.2.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Report, Section 3.1.1.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Report, Section 3.1.3.
Is a conceptual model presented?	Yes	Described in text.

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Report, Section 3.2. However, further consideration of the retaining wall at the rear of the garden, utilities and reported structural damage is required.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	No	BIA Report, Section 3.2. Further review of ground / groundwater conditions required.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Report, Section 3.2.
Is factual ground investigation data provided?	Yes	BIA Report, Sections 4 and 5. Review soil descriptions; insitu shear strength to be confirmed.
Is monitoring data presented?	Yes	Further monitoring recommended.
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	It is reported that 1c Spencer Rise has a lower ground floor at the rear of the building to a depth of 1.2m below rear garden level and that 3 Spencer Rise does not appear to have an existing basement (BIA Report, Section 3.1.2).
Is a geotechnical interpretation presented?	Yes	BIA Report, Sections 6.1 and 7. Insitu shear strength to be confirmed and interpretation reviewed, as required.
Does the geotechnical interpretation include information on retaining wall design?	Yes	BIA Report, Section 7.4.

Item	Yes/No/NA	Comment
Are reports on other investigations required by screening and scoping presented?	Yes	An Arboricultural Assessment is provided.
Are baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	
Is an Impact Assessment provided?	Yes	BIA Report, Section 7.9. However, not all potential impacts considered.
Are estimates of ground movement and structural impact presented?	Yes	BIA Report, Section 7.6. However, further assessment required.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	Further consideration of ground / groundwater conditions in relation to stability / hydrogeology required; GMA to be reviewed as described in audit report Section 4.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	Depending on final assessment, additional mitigation may be required.
Has the need for monitoring during construction been considered?	Yes	Appendix 4 of the Vincent & Rymill report. Text / drawings to consistently reference monitoring frequency.
Have the residual (after mitigation) impacts been clearly identified?	No	Further assessment into groundwater and stability is required.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	Consideration of ground / groundwater conditions in relation to stability; GMA and structural calculations / method statement to be reviewed
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	

Item	Yes/No/NA	Comment
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	Further consideration of ground / groundwater conditions in relation to stability required; GMA and structural calculations / method statement to be reviewed.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	However, GMA to be reviewed.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. The BIA has been prepared by Ground & Water with supporting documents prepared by Vincent & Rymill. The authors' qualifications are in accordance with the requirements of CPG guidelines.

4.2. The proposed scheme involves the excavation of a single storey basement below the entire footprint of a two storey, terrace residential property, with the basement formation level at 4.00m below ground level (bgl). Lightwells will be provided to the front and rear of the building.

4.3. The site investigation and BIA have been informed by a desk study broadly in accordance with the GSD Appendix G1, although utility companies have not been approached with regards to underground infrastructure. The location of underground infrastructure / utilities within the zone of influence should identified and impacts assessed, if applicable.

4.4. The site investigation identified a varying thickness of Made Ground underlain by the London Clay Formation. Its noted that some soil descriptions are consistent with Head Deposits, there are no descriptions of clay stiffness and no insitu testing has been undertaken. Its accepted that the London Clay is present at formation level. Review of the shallower soils should be undertaken, with consideration of potential stability or hydrogeological impacts.

4.5. Whilst interpretative geotechnical information is provided based on reasonably conservative assumptions related to a typical London Clay profile, the ground conditions should be reviewed and insitu shear strength confirmed prior to any construction. Retaining wall design parameters should be considered, following review of the ground conditions.

4.6. The monitoring data indicates that the basement development will be below standing groundwater level. The hydrogeological assessment states that the groundwater encountered is perched and not part of a continuous groundwater body. The BIA concludes that some form of dewatering may be required but states that the Made Ground and London Clay are unlikely to support groundwater flow. This should be reviewed following further monitoring and consideration of the ground conditions.

4.7. The BIA identified that the assumed course of the "lost" River Fleet runs approximately 100m west of the site between the site and Highgate Road. Further assessment of Figure 11 of the Camden Geological, Hydrogeological and Hydrological Study (Lost Rivers of London) indicates that the tributary of the River Fleet historically flowed approximately 30m west of the site. Comments from local residents indicate that this tributary has been culverted beneath York Rise.

4.8. The basement will be constructed utilising underpinned retaining walls and a ground bearing basement slab. Structural calculations and retaining wall design are provided for review along with sequencing and propping information. The structural design principles and calculations

should make explicit reference to the slope across the site and the resultant earth pressures and foundation surcharge loads acting on the basement walls. Calculations currently allow for a horizontal ground surface behind the basement retaining wall which may not be the case.

4.9. An assumed bearing capacity of 125kPa within the London Clay has been used as the basis of settlement calculations, which indicate settlement of up to 25mm based on the stated bearing pressures of 70 – 100kPa.

4.10. Considering the proposed form of construction, the description of soils presented and the likelihood of encountering groundwater, suitable mitigation measures to maintain stability during construction should be proposed.

4.11. A Ground Movement Assessment (GMA) is presented that considers the movements relating to the proposed basement construction and the effect on the adjacent properties at 1c, 3, 5, 1b, 1a and 7 Spencer Rise. For the structures assessed, a maximum damage category of 1 (very slight) in accordance with the Burland scale is indicated. However, the assessment is not accepted and further assessment of the following is required:

- Whilst the estimated horizontal ground movements appear reasonable, considering the depth of the proposal and form of construction, the estimated vertical movements appear to be low and should be justified.
- The stated settlement of the underpinned foundations is up to 25mm. The GMA should consider cumulative movements from installation of retaining walls, excavation in front of the walls and settlement of the foundations.
- Its noted that neighbours report existing structural damage. This should be confirmed and appropriate mitigation proposed, when considering damage to neighbouring properties.
- The assessment should include for impacts to the highway and utility infrastructure within the zone of influence.
- Consultation responses indicate a retaining wall to the rear of the property. The assessment should consider this structure and any impact to it.

4.12. Structural monitoring is proposed during the construction works. The frequency of monitoring should be consistently presented within the reports and drawings. The proposals should be reviewed following the updates to the GMA required.

4.13. Spencer Rise is within Critical Drainage Area (Group 3-001), although this was not identified within the BIA screening or scoping process. The site is located adjacent to the York Rise flood risk zone but not within it. The site did not flood in either 2002 or 1975 although York Rise (to the west of the site) did flood in 1975 and York Rise is at 'low' risk of surface water flooding and of being at risk from reservoir flooding. The site is at very low risk of surface water flooding,

although standard flood risk mitigation measures are recommended to be incorporated into the final design.

4.14. It is reported that the site area is currently 100% impermeable and there will be no change under the proposed development. There will be no impact to the wider hydrological environment. The final drainage design will need to be approved be in accordance with LBC's and Thames Water's requirements

4.15. Impact assessments, in relation to hydrogeology and stability, should be reviewed once the additional information required has been presented and mitigation proposed, as required.

5.0 CONCLUSIONS

5.1. The authors' qualifications are in accordance with the requirements of CPG Basements.

5.2. The location of underground infrastructure / utilities within the zone of influence should identified and impacts assessed, if applicable.

5.3. A site investigation has identified a varying thickness of Made Ground underlain by the London Clay Formation. Its noted that some soil descriptions are consistent with Head Deposits. The ground conditions should be reviewed and insitu shear strength confirmed prior to any construction.

5.4. The hydrogeological assessment states that the groundwater encountered is perched and not part of a continuous groundwater body. This should be reviewed following further monitoring and consideration of the ground conditions.

5.5. The basement will be constructed utilising underpinned retaining walls and a ground bearing basement slab. Considering the proposed form of construction, the description of soils presented and the likelihood of encountering groundwater, suitable mitigation measures to maintain stability during construction should be proposed.

5.6. The structural method statement and calculations require review as described in Section 4.

5.7. A Ground Movement Assessment (GMA) is presented that considers impacts to the adjacent properties. The GMA is not accepted and further assessment is required.

5.8. The GMA should additionally consider potential impacts to utilities and the retaining wall at the rear of the property. Its noted that neighbours report existing structural damage which should be confirmed and appropriate mitigation proposed, if applicable.

5.9. Structural monitoring is proposed during the construction works. The frequency of monitoring should be consistently presented within the reports and drawings.

5.10. The site is at very low risk of flooding.

5.11. It is reported that the site area is currently 100% impermeable and there will be no change under the proposed development. There will be no impact to the wider hydrological environment.

5.12. Impact assessments, in relation to hydrogeology and stability, should be reviewed once the additional information required has been presented and mitigation proposed, as required.

5.13. Queries and matters requiring further information or clarification are summarised in Appendix 2. Until the additional information requested has been provided, the requirements of CPG Basements have not been met.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Dogmetchi	Not provided	27/06/2018	There has been 'substantial subsidence to a number of houses in the street'. The application's references to flood risk seem to make no clear mention of the presence of the River Fleet in a culvert under York Rise.	Section 4
Black	Not provided	27/06/2018	Concerns about foundations and party walls of adjoining properties during excavation. A consequence of the recent work to contain flooding on the Heath could be to risk increasing the run-off of excess water into the Fleet. This passes the bottom of Spencer Rise, only 30 metres away and at approximately the same depth as the bottom of the proposed basement. I would also like to emphasise the known risk of subsidence in the street. This has already affected several properties and can only be increased by the excavation.	Section 4
Blaxland	Not provided	07/07/2018	Spencer Rise comprises late 19th century houses on a hill with historic problems of subsidence. A basement development would have the potential to contribute to structural damage to my property which is 2 doors down from the proposed site. The Fleet River runs beneath York Rise at the bottom of the street. Issues of flood risk caused by disturbance to the infra-structure as a result of the development cannot be ignored.	Section 4
Vocadlo	Not provided	10/07/2018	Concerns regarding subsidence: there is history of subsidence in Spencer Rise, and such excavations, together with the heavy-duty machinery, trucks and lorries required that will be trundling down the street, may cause or accelerate further subsidence.	Section 4 and Construction Management Plan
Owen	Not provided	12/07/2018	There has been 'substantial subsidence to a number of houses in the street'. The application's references to flood risk seem to make no clear mention of the presence of the River Fleet in a culvert under York Rise.	Section 4

Anderson	Not provided	13/07/2018	Spencer Rise is a row of Victorian terraced houses built on a hill, on clay with an underground river at the bottom and an underground stream running down the hill. Many houses have already had to deal with subsidence and there is a fear that both large scale excavation and the insertion of rigid structures can have an impact far beyond the immediate environs of this work.	Section 4
Tyacke	Not provided	16/07/2018	Numbers 1a, 1b and 1c Spencer Rise are nineteenth-century historic in-fills, between no. 6 York Rise and no. 1 Spencer Rise. In the 1970s 6 York Rise was demolished, having been allowed to fall into decay. Following this, for some five years the site remained vacant. Despite 1a Spencer Rise being propped up by raking shores, significant movement of the party wall occurred during the interim. The present building at 6 York Rise comprises two flats and a maisonette; albeit brick-faced, it is essentially a ferro-concrete construction. In the late 1980s cracks appeared in the party wall between 1a and 1b Spencer Rise. Clay shrinkage was diagnosed as part of the problem, although the effects of unnatural rigidity introduced by the new building at 6 York Rise cannot be ruled out. In the event, it was decided not to underpin the party wall between 1a and 1b Spencer Rise, but simply to make good the damage; less severe cracking has continued to occur, particularly where the main buildings adjoin the rear extensions. Spencer Rise, as the name implies, is built on a hill slope at the bottom of which stand nos. 1, 1c, 1b and 1a (in that order). Given the relatively recent history of movement and cracking, the proposed development at 1 Spencer Rise is very worrying. Not only will the construction of a presumably concrete basement introduce further unnatural rigidity but yet more drying out of the underlying clay is bound to occur. Cracking and movement of the adjacent houses will be the likely result. There are also serious issues concerning sewerage and drainage more generally, as well as the mains water supplies. Existing ground plans are likely to be highly inaccurate. Sewers and drains run under the terrace houses concerned, from back to front and some would appear to be interconnected. Furthermore in the case of 1a Spencer Rise the mains water supply runs under the house from front to back, and this may not be untypical. We are in fact dealing here with a quite delicate infrastructure,	Section 4

			originally dating back to the nineteenth century, and one which has already been adversely affected by recent building.	
Baigneres	Not provided	17/07/2018	We live on the same side as no1. Our house, like most of the houses here, has very shallow footings over clay soil - the earth is a foot below the floorboards - and has moved several times (lateral movement) over the years. The entire row of houses, pushing as it does down the hill, depends on the integrity of the soil beneath it. Several houses on this side have suffered subsidence as well as lateral movement as a result. We therefore do not see how these kind of works, entailing substantial movement of earth downhill from us, could prevent slippage further up the hill which could possibly lead to damage to our house. Evidence of movement can also be seen in the road outside. We also suspect any water running down the hill underground to join the Fleet at York Rise must run close to or below our house. Which is one reason we believe no house on this side beyond a certain point on the hill has a basement that was not part of its original build.	Section 4
Imray	Not provided	Not provided	Most if not all of the houses on Spencer Rise were cheaply constructed with only minimal foundations and therefore the street is susceptible to movement with a history of subsidence and underpinning. Movement on the north side is greater than that on the south so in the long term there must be a risk that substantial disturbance through excavation and groundworks on this bottom-of-street site will affect the stability not just of immediately adjacent houses but also of those further up the road. The River Fleet runs 30 metres away underneath York Rise. There is a possibility that instability on the north side has been exacerbated by the presence of groundwater behind or below the houses on that side. Residents report drainage and damp issues.	Section 4
Schneebeli	Not provided	19/07/2018	Concerns about the disruption to groundwater. Historically there was a large pond in York Rise at the bottom of Spencer Rise along the course of the Fleet River which now runs in a very large brick culvert under the road. There is a feed stream to the Fleet that runs behind the houses on the north side of Spencer Rise. Ms. Schneebeli is a 'near neighbour downhill from 1 Spencer	Section 4

			Rise' and has continuous wet ground in her garden which is at the bottom of the hill and incurable damp walls in the ground floor of her house. The house directly behind the applicant's house has a 3 metre retaining wall with my garden which is not in good condition.	
Anonymous	Not provided	21/07/2018	Spencer Rise has a pronounced slope and there is already regular significant subsidence and ground movement to properties within the vicinity of the proposed development. Concerns about ground movement and subsidence to adjacent and other neighbouring properties.	Section 4
Briscoe	Not provided	28/07/2018	Concerns regarding subsidence and lack of assessment of culverted River Fleet under York Rise.	Section 4

Appendix 2: Audit Query Tracker

CampbellReith
consulting engineers

Audit Query Tracker

Query No	Subject	Query	Status/Response	Date closed out
1	BIA	Utility infrastructure information to be provided, noting neighbours' comments of drainage beneath the property.	Open	
2	Stability / Hydrogeology	Factual site investigation data to be reviewed and interpretative assessment of geological units considered.	Open	
3	Stability / Hydrogeology	Further groundwater monitoring recommended and consideration of potential for groundwater flow in regard to hydrogeological impacts and impacts to stability during underpinning, including mitigation proposals, as required.	Open	
4	Stability	Insitu shear strength of soils to be established; design parameters to be reviewed.	Open	
5	Stability	GMA to be reviewed in accordance with comments in Section 4, including impacts to utilities and retaining wall to be assessed.	Open	
6	Stability	Reported structural damage by neighbours to be considered and mitigated, as required.	Open	
7	Stability	Structural method statement and calculations to be revised to consider slope across site.	Open	
8	Stability	Structural monitoring proposals to be reviewed following update to GMA. Text and drawings to be consistent.	Open	

Appendix 3: Supplementary Supporting Documents

None

London

Friars Bridge Court
41- 45 Blackfriars Road
London, SE1 8NZ

T: +44 (0)20 7340 1700
E: london@campbellreith.com

Birmingham

Chantry House
High Street, Coleshill
Birmingham B46 3BP

T: +44 (0)1675 467 484
E: birmingham@campbellreith.com

Surrey

Raven House
29 Linkfield Lane, Redhill
Surrey RH1 1SS

T: +44 (0)1737 784 500
E: surrey@campbellreith.com

Manchester

No. 1 Marsden Street
Manchester
M2 1HW

T: +44 (0)161 819 3060
E: manchester@campbellreith.com

Bristol

Wessex House
Pixash Lane, Keynsham
Bristol BS31 1TP

T: +44 (0)117 916 1066
E: bristol@campbellreith.com

UAE

Office 705, Warsan Building
Hessa Street (East)
PO Box 28064, Dubai, UAE

T: +971 4 453 4735
E: uae@campbellreith.com