COGNITION
LAND+WATER

VALIDATION REPORT

AT
LATCHMERE HOUSE

CHURCH ROAD
HAM, MIDDLESEX
TW10 5HH

FOR
BERKELEY HOMES WEST LONDON

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2.	Client:	Berkeley Homes West London
3.	Clients Consultant:	Leap Environmental
4.	Regulators:	Local Authority/Environment Agency

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1.0 INTRODUCTION

1.1 BACKGROUND

Cognition Land & Water Limited (COGNITION) was contracted by Berkeley Homes West London (BHWL) to carry out remediation works at Latchmere House, Church Road, Ham, Middlesex, TW10 5HH. BHWL are constructing new residential properties on site, along with converting the listed Latchmere House building. COGNITION were to remediate previously identified hotspot areas., The contamination consisted of asbestos containing materials (ACMs), lead, heavy metals, and TPH contamination.

There was a layer of approximately 400mm of made ground over the majority of the site, this material was broken out by Rye Demolition Ltd (RYE), under the supervision of COGNITION.

This document is to be read in conjunction with the Remediation Method Statement, LP001059, 31/05/22016, prepared by Leap Environmental Ltd (LEAP).

1.2 PREVIOUS SITE INVESTIGATIONS

COGNITION's supervision of RYE was to watch for any potential contamination in areas other than those already identified on site by previous site investigation; 'Phase II Site Investigation Report', LP001059, 03/03/2016.

1.3 SCOPE OF WORKS

The following is a list of the works completed by COGNITION:

- Supervision of RYE undertaking breakout of all surface hardstandings (concrete/tarmac);
- Excavation of contaminated hotspots;
- Excavation of soils with ACM;
- Hand picking of ACM from soils using picking station;
- Construction of 6no bunded stockpiles out of contaminated areas;
- Set out main road and garden (centre-south of site);
- Excavated stretch of road, approximately 150m in length, parallel to west of site, stockpiled clean excavated material in set out garden area (see Appendix A);
- Stabilised Stockpiles 1-6 with OPC, using a 360-excavator with Allu bucket attachment;
- Backfilled road area with stabilised contaminated material, at a depth of over 1m below the final finish level of the road;
- Rolled with 14t roller, and rolled every 300mm layer of backfilled material;

- Stabilised and backfilled 550mm-650mm of clean, site won material as a clean capping layer;
- Compacted with 14t roller every 300mm layer of backfilled material;
- Backfill and compaction of clean cap to 450mm below finish road level;
- Validation sampling of clean capping layer;
- Plate bearing tests on finished capping layer.

2.0 REMEDIATION WORKS

The works were completed by COGNITION between 2nd May and the 24th June 2016:

2.1 BREAK OUT AND SUPERVISION

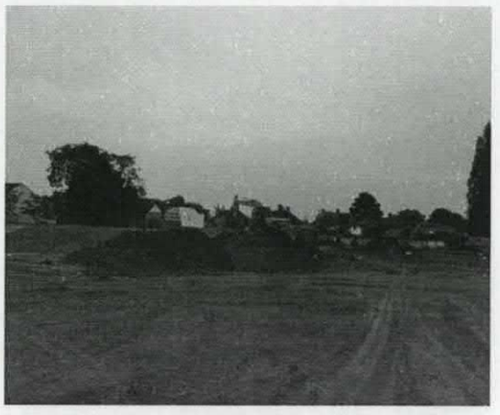
The top layer of hardstanding; comprising of concrete, made ground, tarmac and sub-base, covering approximately 400mm-500mm of material across site, was broken out and stockpiled by RYE under the supervision of COGNITION. This material was segregated and stockpiled by type. Visual and olfactory monitoring was undertaken during the works. The concrete that was broken out was crushed, stockpiled, and removed from site by RYE.

2.2 EXCAVATION AND REMOVAL OF HOTSPOTS

There were a number of hotspot areas across site, as identified in LEAP's site investigation (see Appendix D). These areas were targeted by COGNITION. Under supervision from the site chemist, the hotspots were excavated down to natural ground. The material was stored on a bunded stockpile, and then tested in anticipation of treatment and backfill. The natural ground was subsequently tested for validation.

Excavation of Lead contaminated soils

Natural ground after hotspot removal



Contaminated stockpiles on bunded membrane

2.3 HAND-PICKING AND TREATMENT OF ASBESTOS AREA

During the breakout, a brick tank was found, approximately 500mm below ground level (bgl), which contained slurry, construction rubble, and pieces of ACMs (see Appendix B). The area was segregated using Heras fencing, and appropriate signage was installed. A decontamination area was set up, and an asbestos skip was brought to site and installed in the asbestos works' area. The area was then hand-picked with ACMs, appropriately double bagged, and placed within the skip. The surrounding materials were then excavated down to natural ground, and stockpiled in a bunded area (SP5), covered with polythene, and tested (SP5).

Suppression of ACM's using wetting agent

2.4 STABILISATION AND BACKFILL OF MATERIAL

Once all known areas of contamination were excavated and stockpiled, an Allu bucket was used to mix the material with Ordinary Portland Cement (OPC), this process allowed for:

- → The material to be aerated, reducing the total amount of PAH and TPH in the material;
- → Minimising the risk of any contamination leaching into the surrounding ground, as well as reducing the risk of any asbestos fibres becoming air-bourne;
- → Increase ground bearing strength

Stabilisation of stockpile 6

The material was backfilled at the required depth to minimise the risk of any contamination leaching into the surrounding material, as well as to reduce the risk of future receptors coming into contact with it. Table 1 shows the make-up of ground within the road:

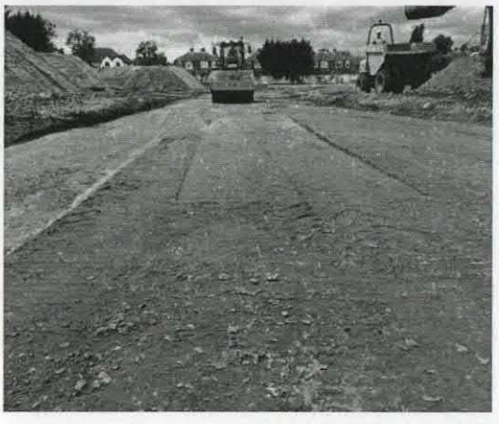
Table 1

Depth (m AOD)	Material	Treatment	Validation
8.05m-8.5m	Tarmac (installation by others)	N/A	N/A
7-7.5m – 8.05m	Clean cap: natural ground (site won) stabilised with OPC	OPC-stabilisation and compaction	A1, B2, C3, D4, E5, G7, H6, I7, K8, L9, M10
Between 6m-7.5m	Contaminated material from stockpiles 1-6: Made ground, tarmac, sub-base	OPC-stabilisation, aeration, and compaction	SP1(A)/(B), SBTM1, BGA1, TMBS1, SP5, SP6
Under 6m-6.5m	Natural Ground (sandy soil)	None	HP5, TP1, TP10

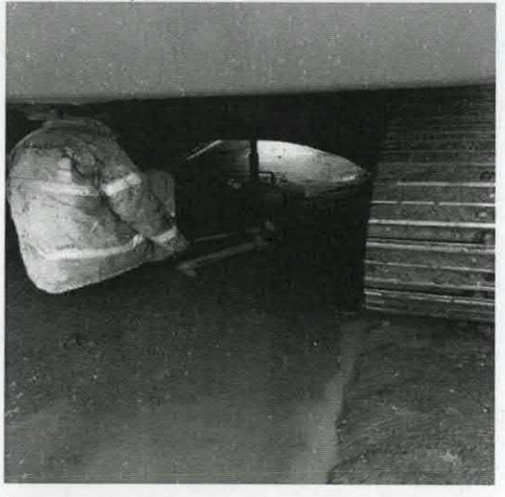
Excavation of road

Placement of stabilised fill from SP2 and 3

Compaction of stabilised material from stockpile 2 and 3



Compaction of natural stabilised clean cap



Geotechnical testing

The only material left stockpiled on site is the natural ground which was excavated within the road area to allow the contaminated stockpiles to be backfilled.

Remaining natural ground stockpiled

2.5 DISPOSAL

As of 29th July 2016, the only material removed from site by COGNITION was an asbestos skip, used to discard ACM and potentially contaminated PPE, both generated during the handpicking of the asbestos hotspot area in the centre of site. Full duty of care was undertaken with the consignment note located within the Appendices

2.6 VALIDATION RESULTS

After the stabilisation and backfill works were completed, the clean capping layer was sampled and tested for asbestos, with one sample taken approximately every 10m along the road trench in the areas where the contaminated material had been backfilled.

I ASBESTOS VALIDATION SAMPLING – AS SHOWN IN APPENDIX A

Sample Reference	Asbestos Present	Quantity	Pass Validation	Notes
A1	No	N/A	Yes	None
B2	Yes	<0.001%	Yes	Fibres only
C3	Yes	<0.001%	Yes	Fibres only
D4	Yes	<0.001%	Yes	Fibres only
E5	No	N/A	Yes	None
G7	No	N/A	Yes	None
H6	Yes	<0.001%	Yes	Fibres only
I7	No	N/A	Yes	None
K8	No	N/A	Yes	None
L9	No	N/A	Yes	None
M10	No	N/A	Yes	None

II PLATE BEARING TESTING – AS SHOWN IN APPENDIX A

Test Reference	Location	Average Settlement at 253kn/m2	Estimated CBR%	Pass	Notes
PB-1	Around E5	1.17mm	69	Yes	None
PB-2	Around M10	1.85mm at 66kn/m2	5.2	No	Area re-rolled and re-tested (PB-3)
PB-3	Around M10	1.38mm	64	Yes	Re-test passed

III MATERIAL MOVEMENT AND SAMPLING SUMMARY – AS SHOWN IN APPENDICES B AND C

Stockpile/Location, and Volume (m3)	Colour	Source Area	Levels (mg/kg)	Sample Ref	Validation Reference	Pass Y/N
SP1 - 208	Red	Roundabout	PAH: 45 Lead: 210 TPH: 79 Asbestos: None	SP1(A)/(B)	K8, L9, M10	Yes
SP2 - 373	Light Blue	Immediately Under Tarmac: grey/black made ground	PAH: 544 Lead: 54 TPH: 1790 Asbestos: Amosite fibres, <0.001%	SBTM1	C3, D4, E5	Yes
SP3 - 144	Dark Blue	Asbestos Contaminated Area: made ground, concrete grey/black	PAH: 49 Lead: 220 TPH: 219 Asbestos: None	BGA1	A1, B2	Yes
SP4 - 136	Green	Clean Sub-base, made ground	PAH: 11 Lead: 13 TPH: 42 Asbestos: None	TMBS1	I7	Yes
SP5 - 88	Orange	Material in tank, slurry and made ground, asbestos pieces picked out, now only fibres	PAH: 73 Lead: 360 TPH: 352 Asbestos: Chrysotile and Amosite fibres, <0.001%	SP5	G7	Yes
SP6 - 73	Yellow	HP5 Area: mix of made ground and natural ground (sandy soil)	PAH: 15 Lead: 74 TPH: 82 Asbestos: None	SP6	H6	Yes
Under Tarmac Base	Black		PAH: 129 Lead: 69 TPH: 325 Asbestos: None	STM1	N/A	N/A
Under Roundabout (House)	Purple			S1	N/A	N/A
Under Roundabout (Gate)	Grey			S2	N/A	N/A

3.0 CONCLUSION

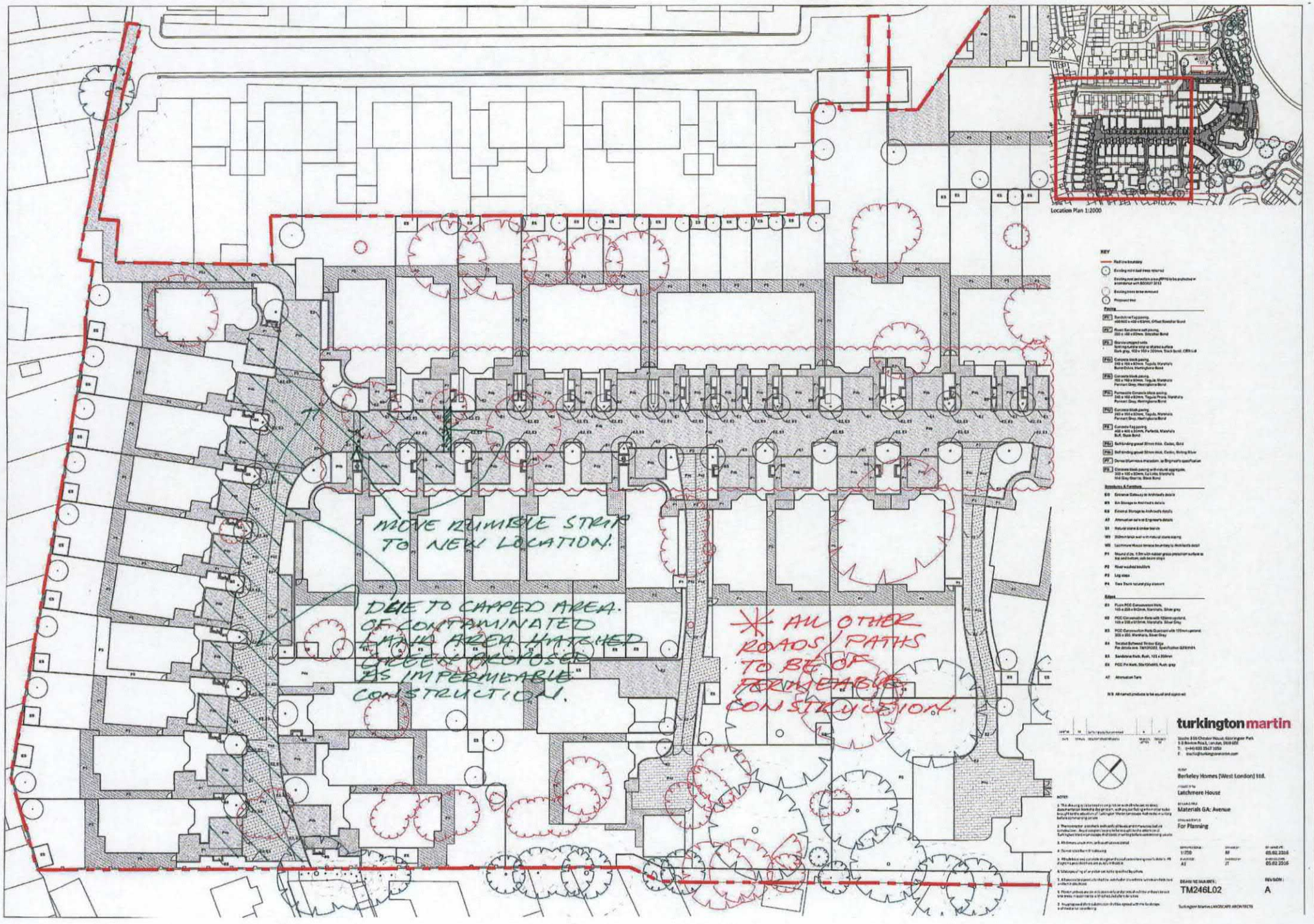
COGNITION completed the remediation works in accordance with the *Remediation Method Statement LP001059 (31/05/2016)*, prepared by Leap Environmental Ltd as agreed with the local authority and Environment Agency.

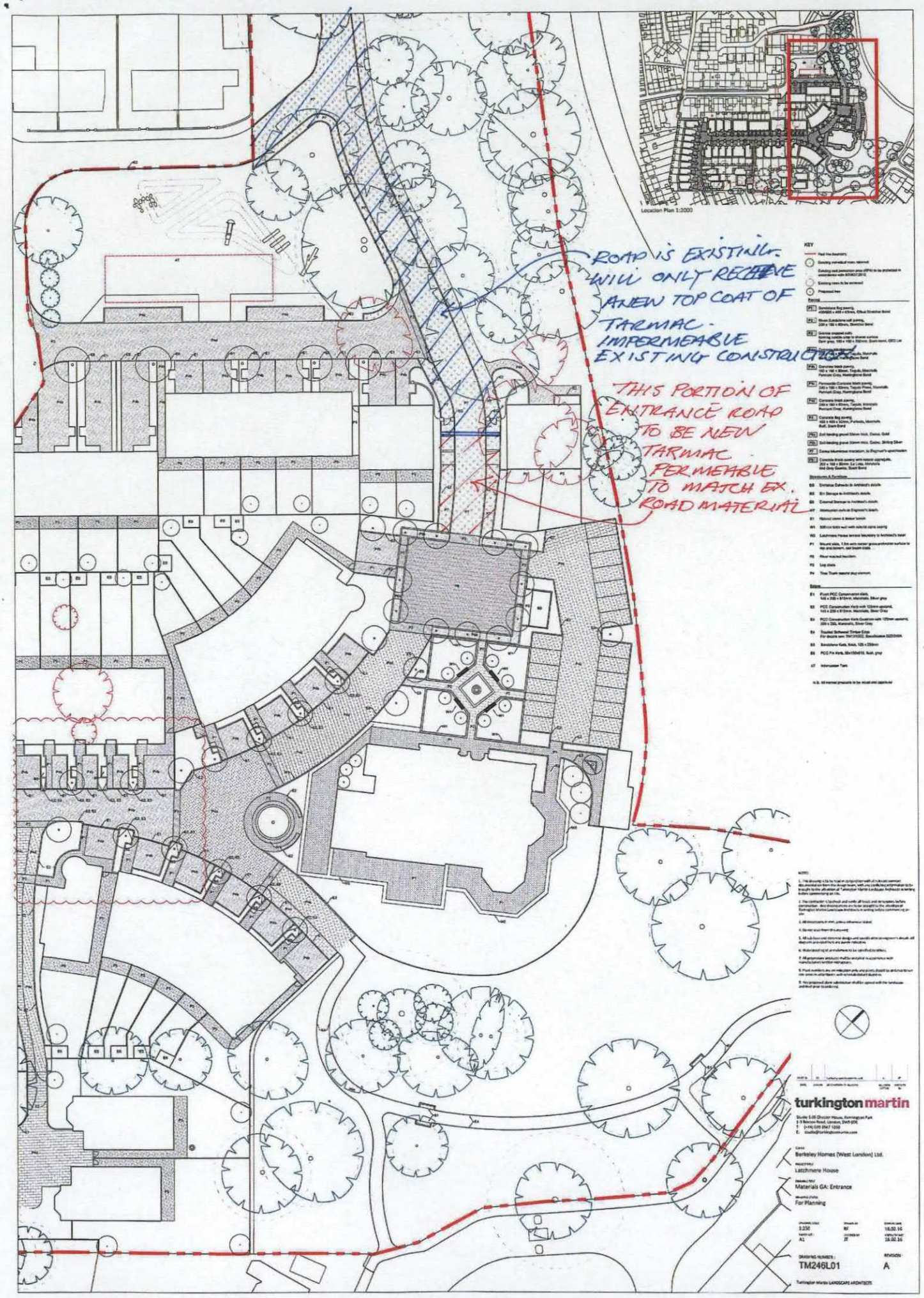
All known areas of contamination identified in site investigation works were removed and the soils stockpiled and tested. Once chemical testing confirmed the proposed treatment would present a viable remedial option, contaminated soils were treated using cement encapsulation and backfilled at depth, allowing for a clean cap layer of 550-650mm depth below road formation levels. Where required handpicking for visible asbestos fragments was also carried out prior to backfill. Treated material and the above clean cap material was backfilled in layers and compacted as per the *Specification for Highway Works Series NG600: Earthworks.* Plate-bearing tests were then carried out on the finished surface to ensure suitable compaction had been achieved.

In adherence to the discovery strategy described in the method statement the site was visually assessed during all stages of the remedial activity. During excavation works a brick tank was discovered, approximately 500mm bgl, containing visible fragments of cement-bonded asbestos sheeting. The ACM was removed by handpicking and placed in a sealed asbestos skip and disposed offsite. The surrounding soils were stockpiled, tested and treated as described above. No other suspected hot spot areas were detected during the work and it is concluded that all potential sources of contamination detectable during excavation to the agreed formation levels have been removed from site.

Validation testing was carried out on the clean capping layer and no significant contaminants were reported. Four samples showed traces of asbestos fibres at less than 0.001%, a concentration which is deemed safe for re-use, as per the agreed remediation strategy.

All materials which remain stockpiled on site were generated during COGNITION's works, are solely comprised of natural ground which was removed from the road area to allow for the stabilised backfill material from stockpiles 1-6.


MOVE RUMBLE STRIP TO NEW LOCATION.
DUE TO CAPPED AREA OF CONTAMINATED MADE AREA HATCHED GREEN PROPOSED AS IMPERMEABLE CONSTRUCTION.
* ALL OTHER ROADS / PATHS TO BE OF PERMEABLE CONSTRUCTION.
Location Plan 1:2000
KEY
turkington martin
Berkeley Homes (West London) ltd.
Latchmere House
Materials GA: Avenue
For Planning
1:250
A1
05.02.2016
TM246L02
A


Location Plan 1:2000
ROAD IS EXISTING. WILL ONLY RECEIVE A NEW TOP COAT OF TARMAC. IMPERMEABLE EXISTING CONSTRUCTION
THIS PORTION OF ENTRANCE ROAD TO BE NEW TARMAC PERMEABLE TO MATCH EX. ROAD MATERIAL
KEY
turkington martin
Berkeley Homes (West London) Ltd.
Latchmere House
Materials GA: Entrance
For Planning
1:250
A1
18.02.16
TM246L01
A