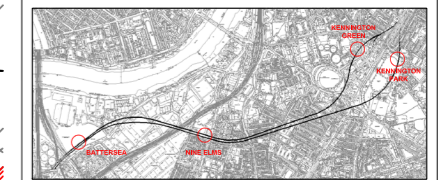
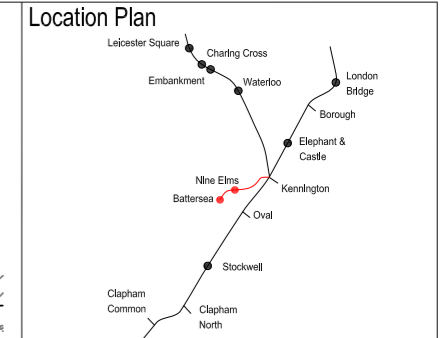
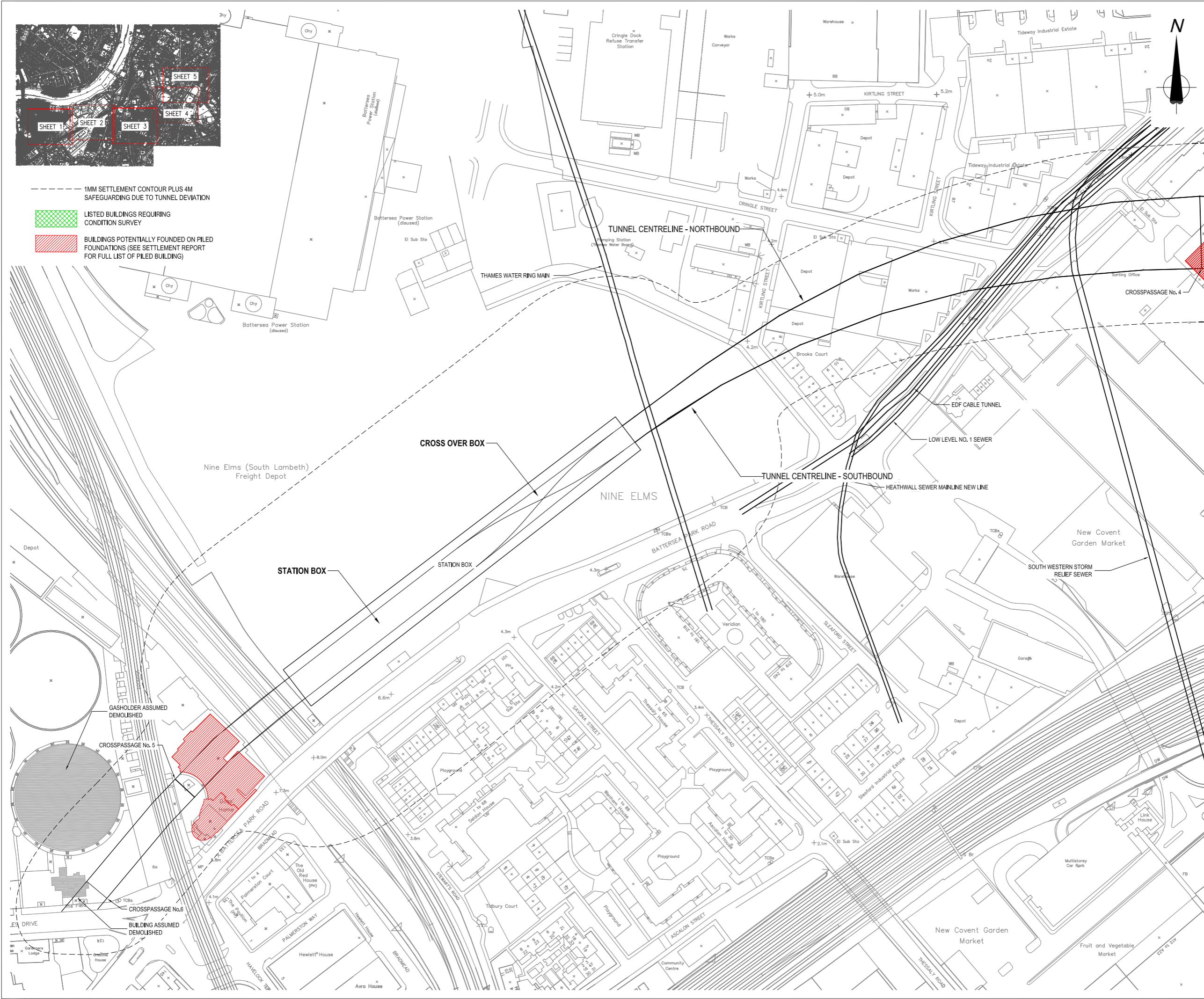


- 1MM SETTLEMENT CONTOUR PLUS 4M SAFEGUARDING DUE TO TUNNEL DEVIATION
- LISTED BUILDINGS REQUIRING CONDITION SURVEY
- BUILDINGS POTENTIALLY FOUNDED ON PILED FOUNDATIONS (SEE SETTLEMENT REPORT FOR FULL LIST OF PILED BUILDING)



- Notes:**
1. ALL CONTOURS SHOWN ARE IN MM.
  2. ANALYSIS HAS BEEN BASED ON THE INFORMATION AVAILABLE AT THE TIME OF DESIGN.
  3. MODELLING ONLY TAKES ACCOUNT OF THE IMPACT OF THE NORTHERN LINE EXTENSION AND ASSOCIATED INFRASTRUCTURE E.G. STATION BOXES. THE EFFECTS OF BATTERSEA POWER STATION REDEVELOPMENT HAVE NOT BEEN INCORPORATED.
  4. TUNNEL ALIGNMENT BASED ON DRAWING GRNLEB-HGL-00-XX-M2-PHY-0010-02-01.
  5. CROSS PASSAGE LOCATION BASED ON DRAWING GRNLEB-HGL-00-XX-DR-TUN-20402-03-01.
  6. SUBSTATION AT KENNINGTON PARK BASED ON DRAWING GRNLEB-BHD-ST-XX-DR-STR-13120-01-01.
  7. ADIT BETWEEN SHAFT AND HEADHOUSE AT KENNINGTON GREEN BASED ON DRAWING GRNLEB-HGL-00-XX-DR-TUN-23000-03-01.
  8. SETTLEMENT DUE TO RUNNING TUNNELS ARE BASED ON A 1.5% VOLUME LOSS. SEE SETTLEMENT REPORT FOR FULL DETAILS ON OTHER TUNNEL TYPES.
  9. SETTLEMENT DUE TO STATION EXCAVATIONS ARE BASED ON CURVES FROM CIRIA C580 FIGURE 2.9 (B) EXCEPT THE ADIT AT KENNINGTON GREEN WHICH IS BASED ON CIRIA C580 FIGURE 2.12. THE GROUND MOVEMENT CURVES ARE CONSIDERED TO REPRESENT 100% GROUND MOVEMENT PROFILE, HOWEVER THE STATION EXCAVATIONS WILL HAVE AN INCREASED STIFFNESS AT THE CORNERS, THEREFORE THE SETTLEMENT CONTOURS AROUND THE EXCAVATIONS ARE A CONSERVATIVE ESTIMATE.
  10. LOCATION OF LISTED BUILDINGS IS BASED ON INFORMATION RECEIVED FROM URS ON THE 30/12/13.
  11. SETTLEMENT DUE TO EXCAVATIONS OF SHAFTS IS BASED ON THE LONDON UNDERGROUND MANUAL OF GOOD PRACTICE USING G-056 NEW AND BOWERS (1994).
  12. THE MAP IS BASED ON ORDNANCE SURVEY, REPRODUCED FROM LANDRANGER 1:50,000 MAP BY PERMISSION OF ORDNANCE SURVEY © ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE. © CROWN COPYRIGHT 1988. ALL RIGHTS RESERVED. LICENSE NUMBER: AL 100005517. THE ORDNANCE SURVEY DATA USED WAS THAT AVAILABLE AT THE TIME OF 2012 REFERENCE DESIGN, AND THUS ANY RECENT CHANGES WILL NOT BE REFLECTED IN THE MAPS USED FOR ANALYSIS.

Rev	By	Chkd	Apprv	Date	Description
01-01	NG	JD	SL	25/02/13	FIRST DRAWN

Client  
**Transport for London**

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Halcrow Group Ltd.  
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Elms House, 43 Brook Green  
Hammermith, London W6 7EF  
TEL: 020 3479 8000  
FAX: 020 3479 8001  
www.halcrow.com

Project: **NORTHERN LINE EXTENSION TO BATTERSEA TWAO FOR TIL**

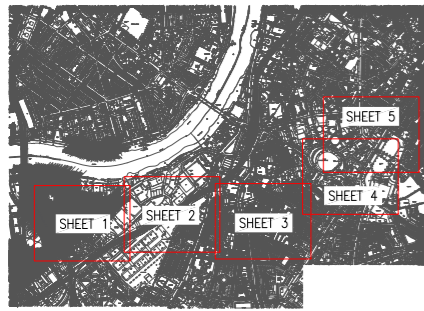
Drawing: **LISTED BUILDINGS REQUIRING CONDITION SURVEY SHEET 1 OF 5**

Submittal: **S4 - FORMAL ISSUE TO CLIENT**

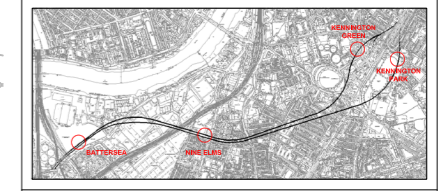
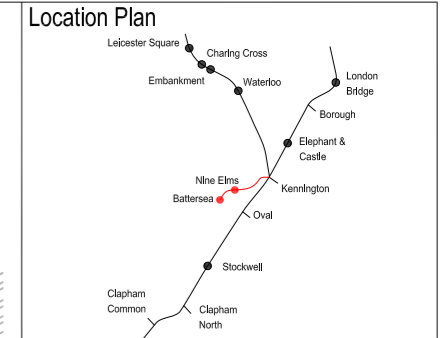
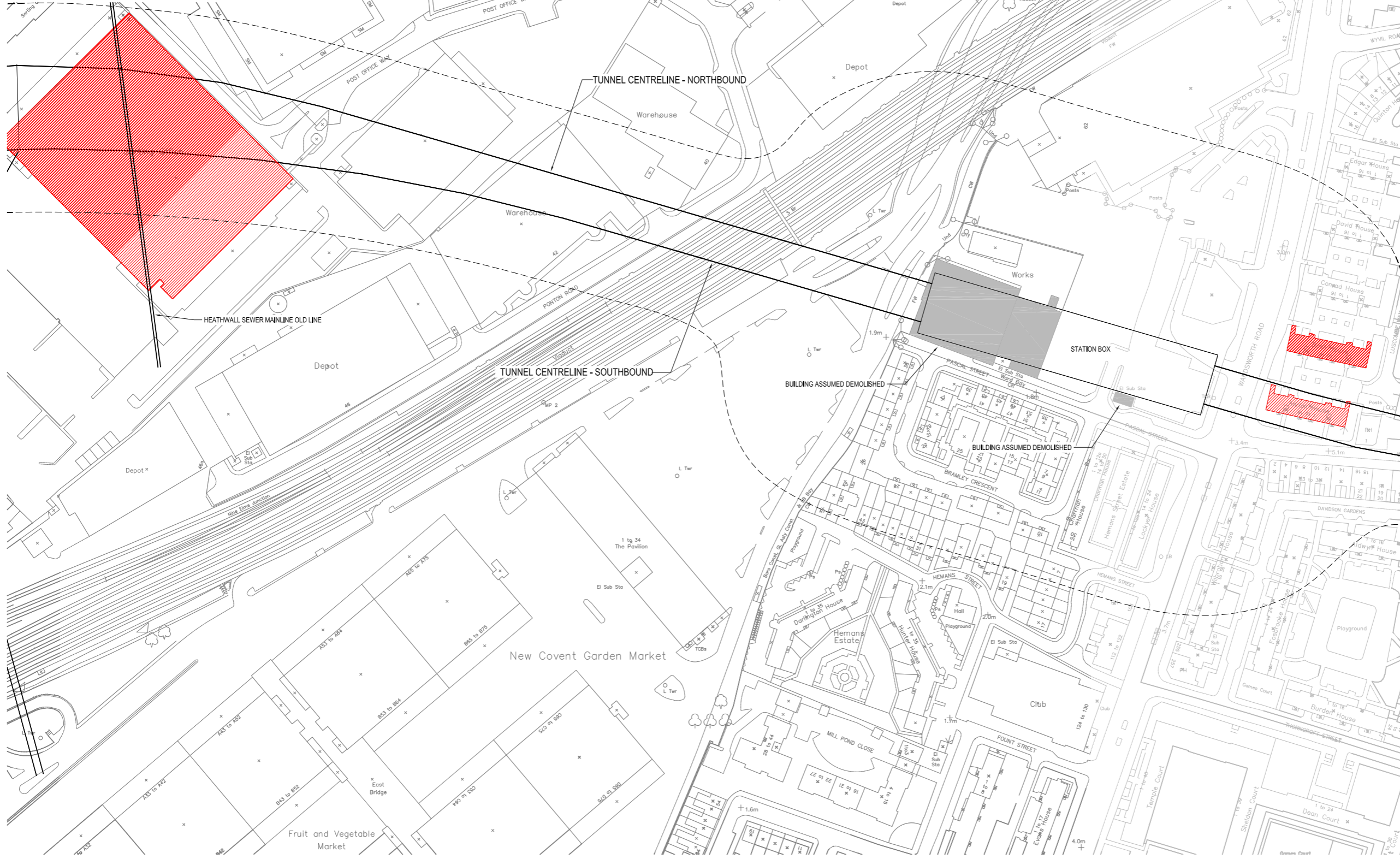
Drawn by: NG Date: 05/02/13  
Checked by: JD Date: 05/02/13  
Approved by: SL Date: 05/02/13  
Drawing Scale: 1:1000

Drawing No: **GRNLEB-BHD-TU-XX-DR-GEO-15605** Revision: **01-01**





- 1MM SETTLEMENT CONTOUR PLUS 4M SAFEGUARDING DUE TO TUNNEL DEVIATION
- LISTED BUILDINGS REQUIRING CONDITION SURVEY
- BUILDINGS POTENTIALLY FOUNDED ON PILED FOUNDATIONS (SEE SETTLEMENT REPORT FOR FULL LIST OF PILED BUILDING)



- Notes:
1. ALL CONTOURS SHOWN ARE IN MM.
  2. ANALYSIS HAS BEEN BASED ON THE INFORMATION AVAILABLE AT THE TIME OF DESIGN.
  3. MODELLING ONLY TAKES ACCOUNT OF THE IMPACT OF THE NORTHERN LINE EXTENSION AND ASSOCIATED INFRASTRUCTURE E.G. STATION BOXES. THE EFFECTS OF BATTERSEA POWER STATION REDEVELOPMENT HAVE NOT BEEN INCORPORATED.
  4. TUNNEL ALIGNMENT BASED ON DRAWING GRNLEB-HGL-00-XX-42-PHY-0011-02-01.
  5. CROSS PASSAGE LOCATION BASED ON DRAWING GRNLEB-HGL-00-XX-DR-TUN-20402-02-01.
  6. SUBSTATION AT KENNINGTON PARK BASED ON DRAWING GRNLEB-BHD-ST-XX-DR-STR-13120-01-01.
  7. ADIT BETWEEN SHAFT AND HEADHOUSE AT KENNINGTON GREEN BASED ON DRAWING GRNLEB-HGL-00-XX-DR-TUN-23000-03-01.
  8. SETTLEMENT DUE TO RUNNING TUNNELS ARE BASED ON A 1.5% VOLUME LOSS. SEE SETTLEMENT REPORT FOR FULL DETAILS ON OTHER TUNNEL TYPES.
  9. SETTLEMENT DUE TO STATION EXCAVATIONS ARE BASED ON CURVES FROM CIRIA C580 FIGURE 2.9 (B) EXCEPT THE ADIT AT KENNINGTON GREEN WHICH IS BASED ON CIRIA C580 FIGURE 2.12. THE GROUND MOVEMENT CURVES ARE CONSIDERED TO REPRESENT 100% GROUND MOVEMENT PROFILE. HOWEVER THE STATION EXCAVATIONS WILL HAVE AN INCREASED STIFFNESS AT THE CORNERS, THEREFORE THE SETTLEMENT CONTOURS AROUND THE EXCAVATIONS ARE A CONSERVATIVE ESTIMATE.
  10. LOCATION OF LISTED BUILDINGS IS BASED ON INFORMATION RECEIVED FROM URS ON THE 30/1/2013.
  11. SETTLEMENT DUE TO EXCAVATIONS OF SHAFTS IS BASED ON THE LONDON UNDERGROUND MANUAL OF GOOD PRACTICE USING G-656 NEW AND BOWERS (1994).
  12. THE MAP IS BASED ON ORDNANCE SURVEY, REPRODUCED FROM LANDRANGER 1:50,000 MAP BY PERMISSION OF ORDNANCE SURVEY © ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE. © CROWN COPYRIGHT 1988. ALL RIGHTS RESERVED. LICENSE NUMBER: AL 10005517. THE ORDNANCE SURVEY DATA USED WAS THAT AVAILABLE AT THE TIME OF 2012 REFERENCE DESIGN, AND THUS ANY RECENT CHANGES WILL NOT BE REFLECTED IN THE MAPS USED FOR ANALYSIS.

Rev	By	Chkd	Apprv	Date	Description
01-01	NG	JD	SL	25/02/13	FIRST DRAWN

Client

**Transport for London**

**studiodare** ARCHITECTS

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TEL: 020 3479 8000  
FAX: 020 3479 8001  
www.halcrow.com

Project: **NORTHERN LINE EXTENSION TO BATTERSEA TWA0 FOR TfL**

Drawing: **LISTED BUILDINGS REQUIRING CONDITION SURVEY SHEET 2 OF 5**

Subtitle: **S4 - FORMAL ISSUE TO CLIENT**

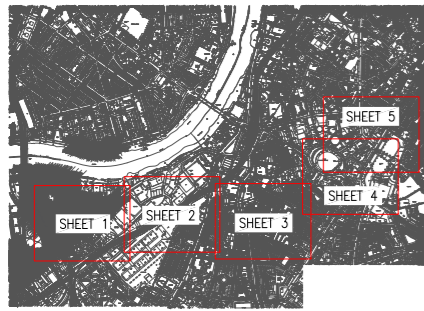
Drawn by: NG Date: 05/02/13  
Checked by: JD Date: 05/02/13  
Approved by: SL Date: 05/02/13  
Drawing Scale: 1:1000

Drawing No.: **GRNLEB-BHD-TU-XX-DR-GEO-15606** Revision: **01-01**

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Drawing file path & name: \\... \righon2\_16:2013 - 32.pn User and Piv Date

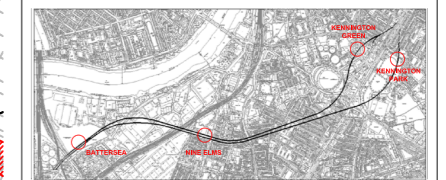
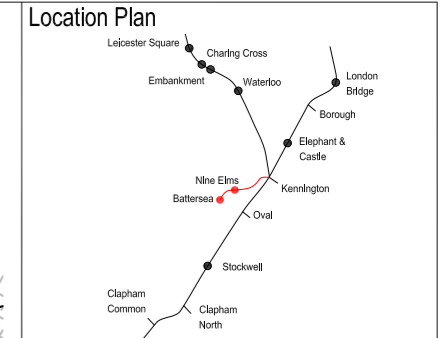
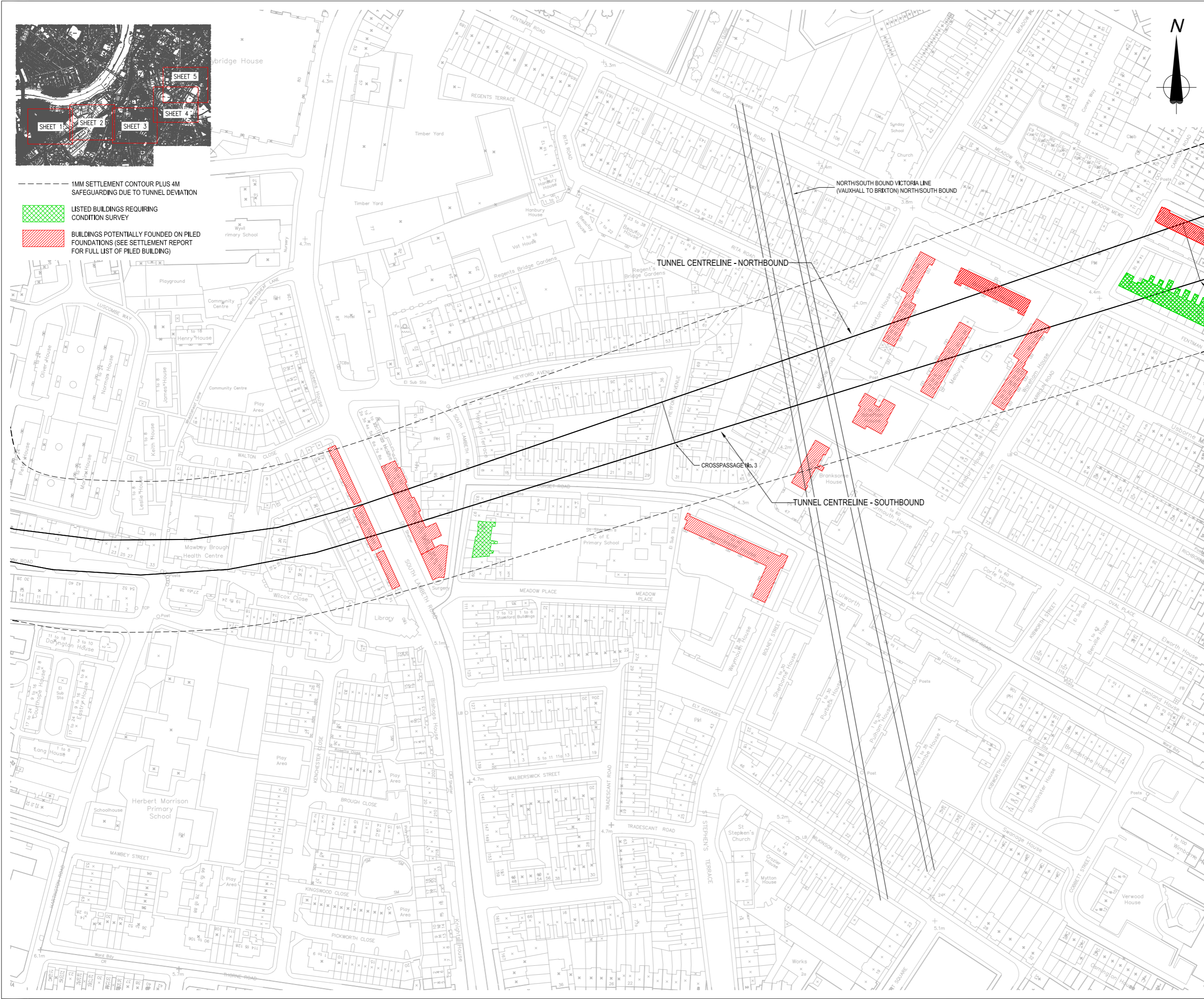




--- 1MM SETTLEMENT CONTOUR PLUS 4M SAFEGUARDING DUE TO TUNNEL DEVIATION

LISTED BUILDINGS REQUIRING CONDITION SURVEY

BUILDINGS POTENTIALLY FOUND ON PILED FOUNDATIONS (SEE SETTLEMENT REPORT FOR FULL LIST OF PILED BUILDING)



- Notes:
- ALL CONTOURS SHOWN ARE IN MM.
  - ANALYSIS HAS BEEN BASED ON THE INFORMATION AVAILABLE AT THE TIME OF DESIGN.
  - MODELLING ONLY TAKES ACCOUNT OF THE IMPACT OF THE NORTHERN LINE EXTENSION AND ASSOCIATED INFRASTRUCTURE E.G. STATION BOXES. THE EFFECTS OF BATTERSEA POWER STATION REDEVELOPMENT HAVE NOT BEEN INCORPORATED.
  - TUNNEL ALIGNMENT BASED ON DRAWING GRNLEB-HGL-00-XX-M2-PHY-0011-02-01.
  - CROSS PASSAGE LOCATION BASED ON DRAWING GRNLEB-HGL-00-XX-DR-TUN-20402-02-01.
  - SUBSTATION AT KENNINGTON PARK BASED ON DRAWING GRNLEB-BHD-ST-XX-DR-STR-13120-01-01.
  - ADIT BETWEEN SHAFT AND HEADHOUSE AT KENNINGTON GREEN BASED ON DRAWING GRNLEB-HGL-00-XX-DR-TUN-23000-03-01.
  - SETTLEMENT DUE TO RUNNING TUNNELS ARE BASED ON A 1.5% VOLUME LOSS. SEE SETTLEMENT REPORT FOR FULL DETAILS ON OTHER TUNNEL TYPES.
  - SETTLEMENT DUE TO STATION EXCAVATIONS ARE BASED ON CURVES FROM CIRIA C580 FIGURE 2.9 (B) EXCEPT THE ADIT AT KENNINGTON GREEN WHICH IS BASED ON CIRIA C580 FIGURE 2.12. THE GROUND MOVEMENT CURVES ARE CONSIDERED TO REPRESENT 100% GROUND MOVEMENT PROFILE. HOWEVER THE STATION EXCAVATIONS WILL HAVE AN INCREASED STIFFNESS AT THE CORNERS, THEREFORE THE SETTLEMENT CONTOURS AROUND THE EXCAVATIONS ARE A CONSERVATIVE ESTIMATE.
  - LOCATION OF LISTED BUILDINGS IS BASED ON INFORMATION RECEIVED FROM URS ON THE 30/12/13.
  - SETTLEMENT DUE TO EXCAVATIONS OF SHAFTS IS BASED ON THE LONDON UNDERGROUND MANUAL OF GOOD PRACTICE USING G-056 NEW AND BOWERS (1994).
  - THE MAP IS BASED ON ORDNANCE SURVEY, REPRODUCED FROM LANDRANGER 1:50,000 MAP BY PERMISSION OF ORDNANCE SURVEY © ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE. © CROWN COPYRIGHT 1988. ALL RIGHTS RESERVED. LICENSE NUMBER: AL 100005517. THE ORDNANCE SURVEY DATA USED WAS THAT AVAILABLE AT THE TIME OF 2012 REFERENCE DESIGN, AND THUS ANY RECENT CHANGES WILL NOT BE REFLECTED IN THE MAPS USED FOR ANALYSIS.

Rev	By	Chkd	Apprv	Date	Description
02-01	NG	JD	SL	19/02/13	AMENDED LISTED BUILDINGS
01-01	NG	JD	SL	25/02/13	FIRST DRAWN

Client

**Transport for London**

**studiodare** ARCHITECTS

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Consulting Engineers

Halcrow Group Ltd.  
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Hammermith, London W6 7EF  
TEL: 020 3479 9000  
FAX: 020 3479 8001  
www.halcrow.com

**Halcrow**

Project: **NORTHERN LINE EXTENSION TO BATTERSEA TWAO FOR T1L**

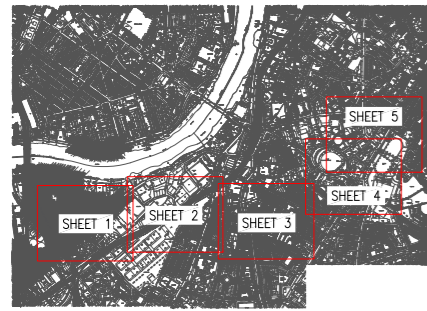
Drawing: **LISTED BUILDINGS REQUIRING CONDITION SURVEY SHEET 3 OF 5**

Submittal: **S4 - FORMAL ISSUE TO CLIENT**

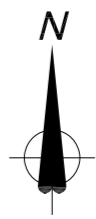
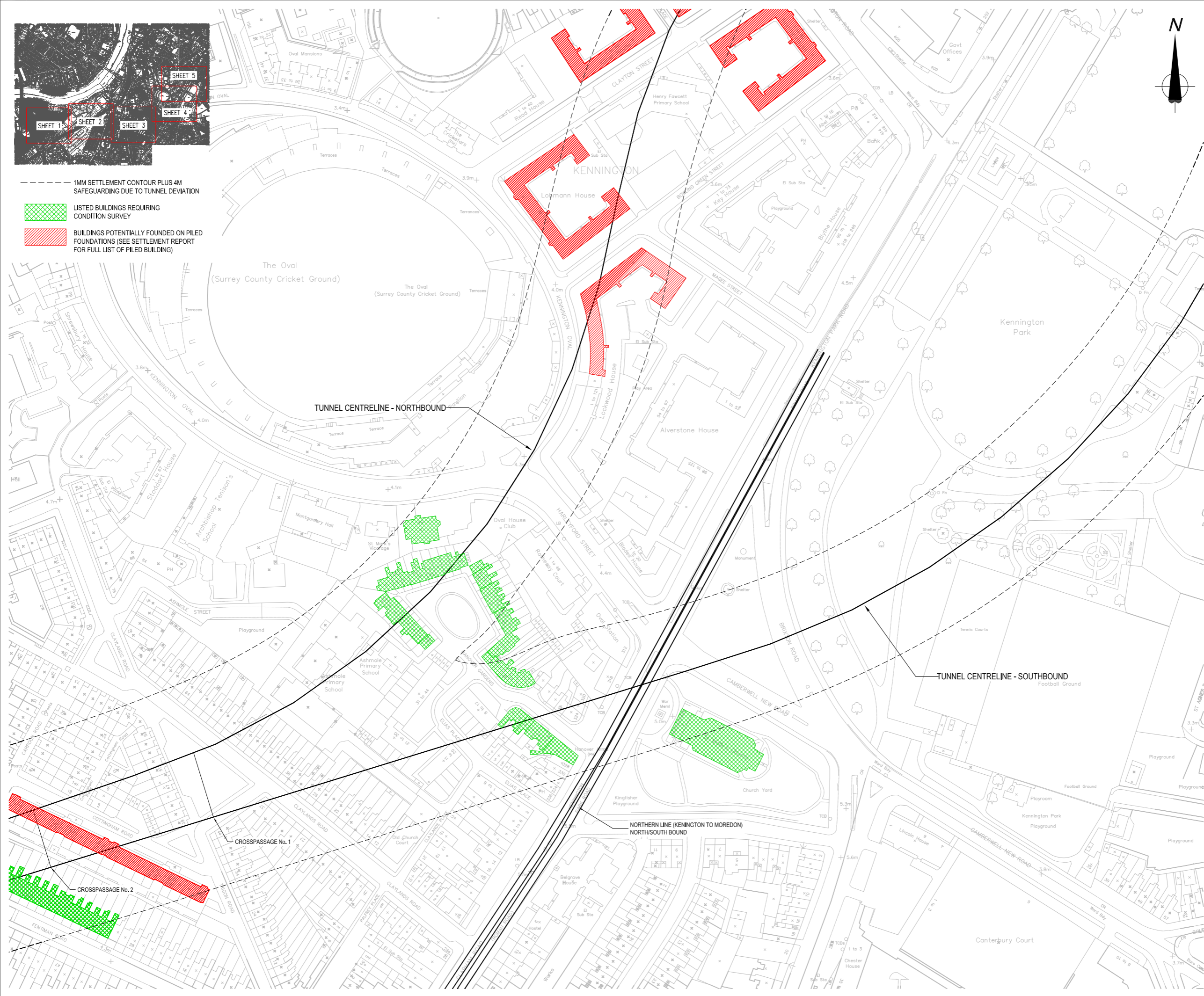
Drawn by: NG Date: 19/02/13  
 Checked by: JD Date: 19/02/13  
 Approved by: SL Date: 19/02/13  
 Drawing Scale: 1:1000

Drawing No.: **GRNLEB-BHD-TU-XX-DR-GEO-15607** Revision: **02-01**

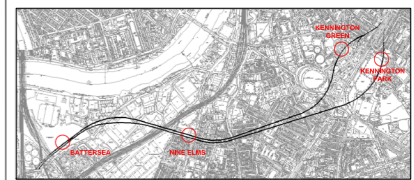
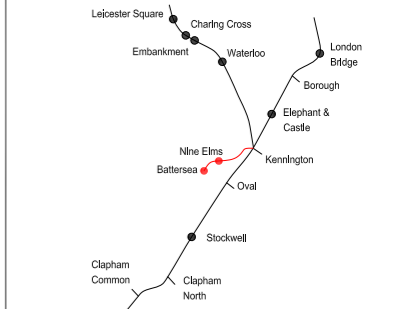




- 1MM SETTLEMENT CONTOUR PLUS 4M SAFEGUARDING DUE TO TUNNEL DEVIATION
- ▨ LISTED BUILDINGS REQUIRING CONDITION SURVEY
- ▨ BUILDINGS POTENTIALLY FOUNDED ON PILED FOUNDATIONS (SEE SETTLEMENT REPORT FOR FULL LIST OF PILED BUILDING)



**Location Plan**



- Notes:**
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  - ANALYSIS HAS BEEN BASED ON THE INFORMATION AVAILABLE AT THE TIME OF DESIGN.
  - MODELLING ONLY TAKES ACCOUNT OF THE IMPACT OF THE NORTHERN LINE EXTENSION AND ASSOCIATED INFRASTRUCTURE E.G. STATION BOXES. THE EFFECTS OF BATTERSEA POWER STATION REDEVELOPMENT HAVE NOT BEEN INCORPORATED.
  - TUNNEL ALIGNMENT BASED ON DRAWING GRNLEB-HGL-00-XX-DR-PHY-0010-02-01.
  - CROSS PASSAGE LOCATION BASED ON DRAWING GRNLEB-HGL-00-XX-DR-TUN-20402-02-01.
  - SUBSTATION AT KENNINGTON PARK BASED ON DRAWING GRNLEB-BHD-ST-XX-DR-STR-13120-01-01.
  - ADIT BETWEEN SHAFT AND HEADHOUSE AT KENNINGTON GREEN BASED ON DRAWING GRNLEB-HGL-00-XX-DR-TUN-23000-03-01.
  - SETTLEMENT DUE TO RUNNING TUNNELS ARE BASED ON A 1.5% VOLUME LOSS. SEE SETTLEMENT REPORT FOR FULL DETAILS ON OTHER TUNNEL TYPES.
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  - SETTLEMENT DUE TO EXCAVATIONS OF SHAFTS IS BASED ON THE LONDON UNDERGROUND MANUAL OF GOOD PRACTICE USING G-056 NEW AND BOWERS (1994).
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Rev	By	Chkd	Apprv	Date	Description
01-01	NG	JD	SL	25/02/13	FIRST DRAWN

Client

**Transport for London**

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TEL: 020 3479 8000  
FAX: 020 3479 8001  
www.halcrow.com

**Halcrow**

Project: **NORTHERN LINE EXTENSION TO BATTERSEA TWAO FOR TfL**

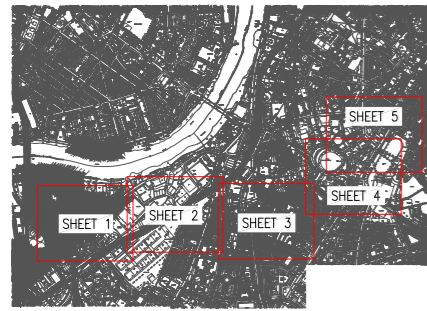
Drawing: **LISTED BUILDINGS REQUIRING CONDITION SURVEY SHEET 4 OF 5**

Submittal: **S4 - FORMAL ISSUE TO CLIENT**

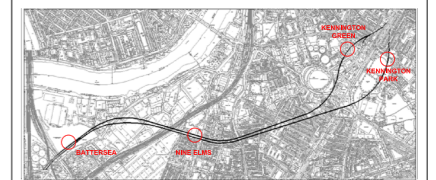
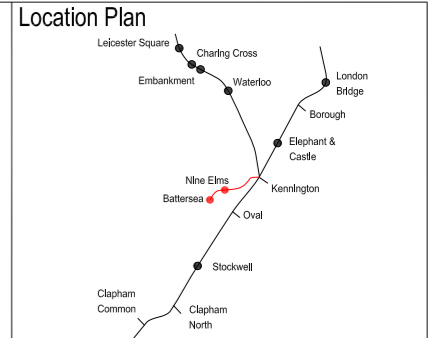
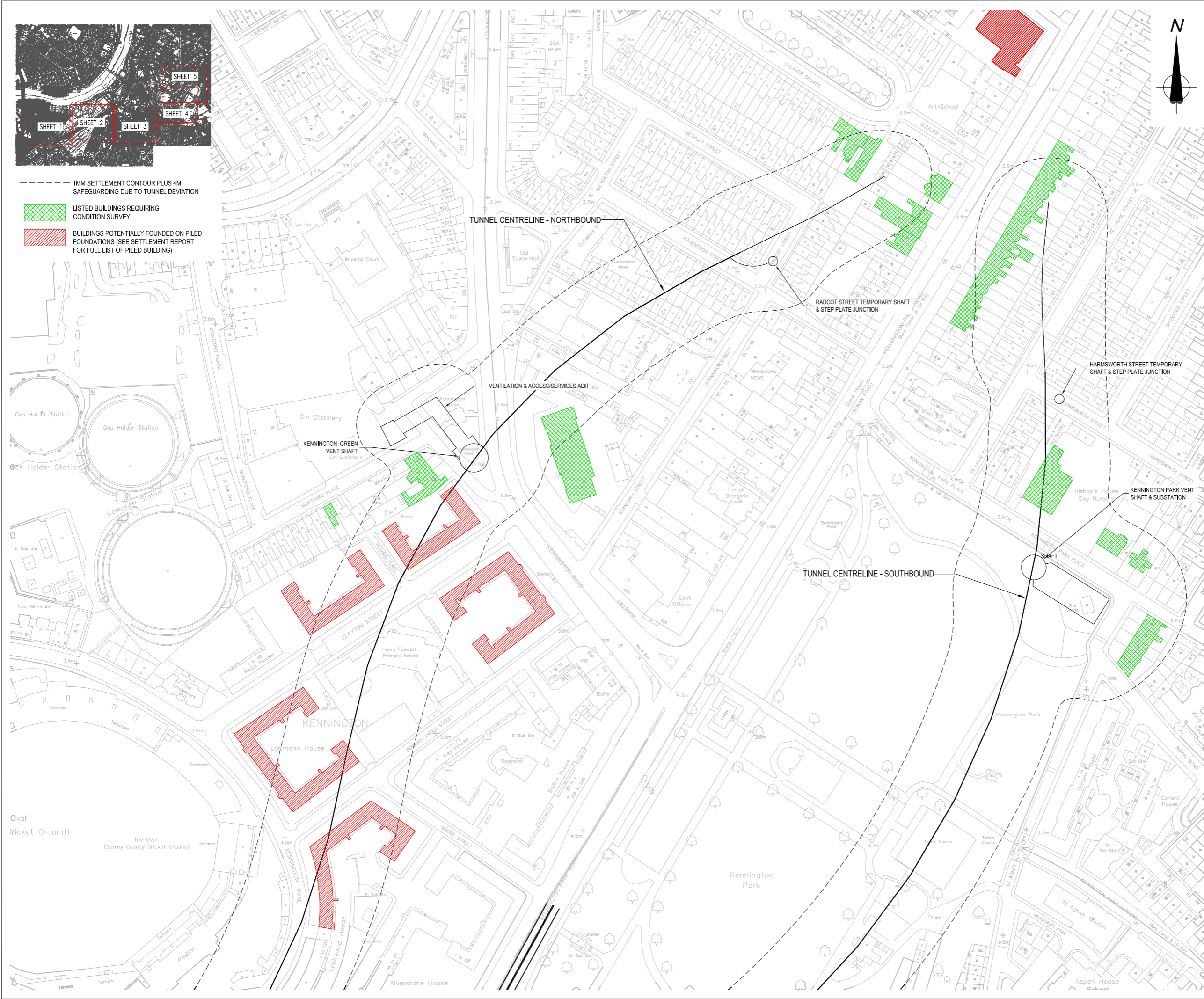
Drawn by: NG Date: 05/02/13  
Checked by: JD Date: 05/02/13  
Approved by: SL Date: 05/02/13  
Drawing Scale: 1:1000

Drawing No.: **GRNLEB-BHD-TU-XX-DR-GEO-15608** Revision: **01-01**





- 1MM SETTLEMENT CONTOUR PLUS 4M SAFEGUARDING DUE TO TUNNEL DEVIATION
- LISTED BUILDINGS REQUIRING CONDITION SURVEY
- BUILDINGS POTENTIALLY FOUNDED ON PILED FOUNDATIONS (SEE SETTLEMENT REPORT FOR FULL LIST OF PILED BUILDING)



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  3. MODELLING ONLY TAKES ACCOUNT OF THE IMPACT OF THE NORTHERN LINE EXTENSION AND ASSOCIATED INFRASTRUCTURE E.G. STATION BOXES. THE EFFECTS OF BATTERSEA POWER STATION REDEVELOPMENT HAVE NOT BEEN INCORPORATED.
  4. TUNNEL ALIGNMENT BASED ON DRAWING GRNLEB-HGL-00-XX-M2-PHY-0011-02-01.
  5. CROSS PASSAGE LOCATION BASED ON DRAWING GRNLEB-HGL-00-XX-DR-TUN-20402-02-01.
  6. SUBSTATION AT KENNINGTON PARK BASED ON DRAWING GRNLEB-BHD-ST-XX-DR-STR-13120-01-01.
  7. ADIT BETWEEN SHAFT AND HEADHOUSE AT KENNINGTON GREEN BASED ON DRAWING GRNLEB-HGL-00-XX-DR-TUN-23000-03-01.
  8. SETTLEMENT DUE TO RUNNING TUNNELS ARE BASED ON A 1.5% VOLUME LOSS. SEE SETTLEMENT REPORT FOR FULL DETAILS ON OTHER TUNNEL TYPES.
  9. SETTLEMENT DUE TO STATION EXCAVATIONS ARE BASED ON CURVES FROM CIRIA C580 FIGURE 2.9 (B) EXCEPT THE ADIT AT KENNINGTON GREEN WHICH IS BASED ON CIRIA C580 FIGURE 2.12. THE GROUND MOVEMENT CURVES ARE CONSIDERED TO REPRESENT 100% GROUND MOVEMENT PROFILE. HOWEVER THE STATION EXCAVATIONS WILL HAVE AN INCREASED STIFFNESS AT THE CORNERS, THEREFORE THE SETTLEMENT CONTOURS AROUND THE EXCAVATIONS ARE A CONSERVATIVE ESTIMATE.
  10. LOCATION OF LISTED BUILDINGS IS BASED ON INFORMATION RECEIVED FROM URS ON THE 30/12/013.
  11. SETTLEMENT DUE TO EXCAVATIONS OF SHAFTS IS BASED ON THE LONDON UNDERGROUND MANUAL OF GOOD PRACTICE USING G-656 NEW AND BOWERS (1994).
  12. THE MAP IS BASED ON ORDNANCE SURVEY, REPRODUCED FROM LANDRANGER 1:50,000 MAP BY PERMISSION OF ORDNANCE SURVEY © ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE. © CROWN COPYRIGHT 1988. ALL RIGHTS RESERVED. LICENSE NUMBER: AL 10005517. THE ORDNANCE SURVEY DATA USED WAS THAT AVAILABLE AT THE TIME OF 2012 REFERENCE DESIGN, AND THUS ANY RECENT CHANGES WILL NOT BE REFLECTED IN THE MAPS USED FOR ANALYSIS.

Rev	By	Chkd	Apprvd	Date	Description
03-01	NR	JD	SL	14/03/13	AMENDED CONTOURS
02-01	NG	JD	SL	19/02/13	AMENDED LISTED BUILDINGS
01-01	NG	JD	SL	25/02/13	FIRST DRAWN

Client

**Transport for London**

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**Halcrow**

Project: **NORTHERN LINE EXTENSION TO BATTERSEA TWAO FOR TfL**

Drawing: **LISTED BUILDINGS REQUIRING CONDITION SURVEY SHEET 5 OF 5**

Submittal: **S4 - FORMAL ISSUE TO CLIENT**

Drawn by: NG Date: 14/03/13  
 Checked by: JD Date: 14/03/13  
 Approved by: SL Date: 14/03/13  
 Drawing Scale: 1:1000

Drawing No.: **GRNLEB-BHD-TU-XX-DR-GEO-15609** Revision: **03-01**