



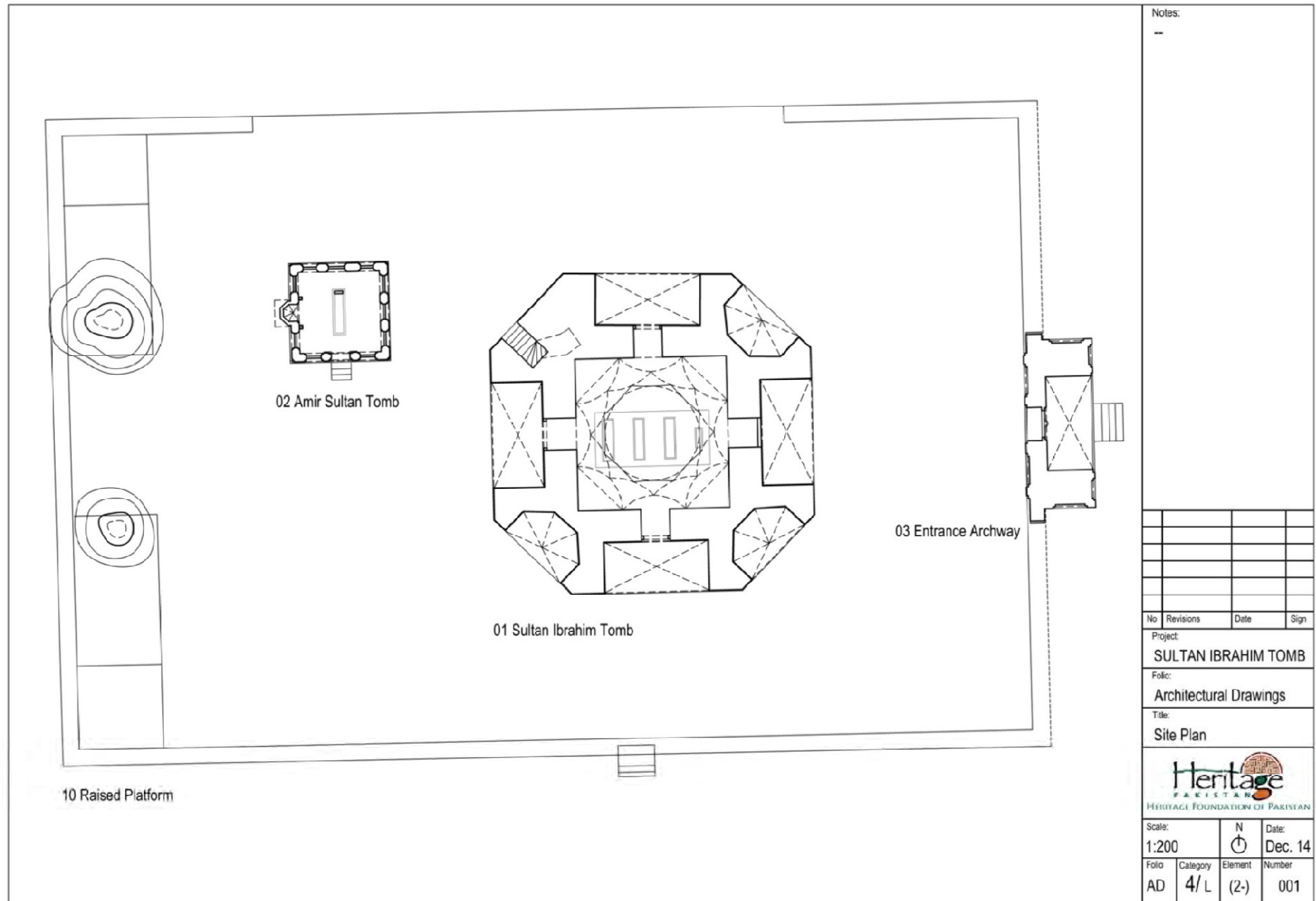
# PRESERVATION OF TOMBS OF SULTAN IBRAHIM & AMIR SULTAN MUHAMMAD, WHS MAKLI

## 1<sup>ST</sup> CONSULTATIVE COMMITTEE MEETING

*Folio X– Condition Survey, Guiding Notes and  
Damage Assessment*



# SITE PLAN



## COMPONENT 01: TOMB OF SULTAN IBRAHIM

- **Octagonal Plan Form with deep alcoves (4.521m x2.235m)**
- **Burnt Brick structure carrying double domes raised on a drum, using squinches in phase of transition, rising to a height of 15.375m**
- **Embellished with glazed tiles (*kashi*) externally and internally, and stucco linings (*manabbat kari*) internally.**
- **4 graves encased in dressed stone sarcophagus incorporating elegantly carved Quranic verses.**



## COMPONENT 02: TOMB OF AMIR SULTAN MOHAMMAD

- **Square Plan Form with stone enclosure size 4.362m x 4.390m**
- **Dressed stone enclosure walls 3.094m High terminated with stone kanguras.**
- **Use of panels of finely carved stone jali (lattice or perforated screen).**
- **1 grave encased in dressed stone sarcophagus incorporating elegantly carved Quranic verses.**





## COMPONENT 03: GATEWAY ARCH

- **Rectangular Plan Form with lofty archway size 2.992m x 8.160m**
- **Burnt brick vaulted structure on dressed stone plinth rising to a height of 5.899m.**
- **Embellished with glazed tiles (kashi).**



## COMPONENT 04: COLLAPSED STRUCTURE

- **Rectangular Plan Form with size 20.141m x 4.420m**
- **Debris showing low dressed stone plinth.**
- **Debris mostly consisting of burnt brick.**



# MASONRY ANALYSIS - TOMB OF SULTAN IBRAHIM

**Study shows interventions carried out over different periods on brick masonry resulting in different types of bricks, mortar colour and surface treatments**

## **PHASE I:**

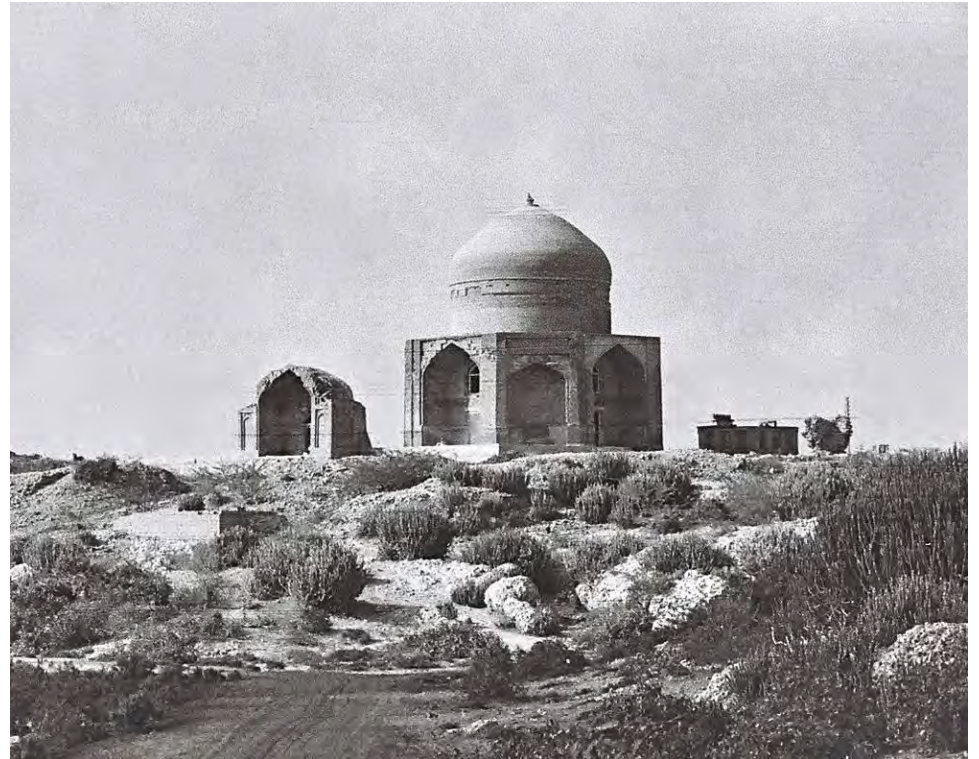
**Original construction**

## **PHASE II:**

**British Period Restoration**

## **PHASE III:**

**1953 and Later Interventions -  
Pakistan Period**





# MASONRY CHARACTERISTICS – PHASE I

## PHASE I:

### Original Burnt Brick Masonry Features

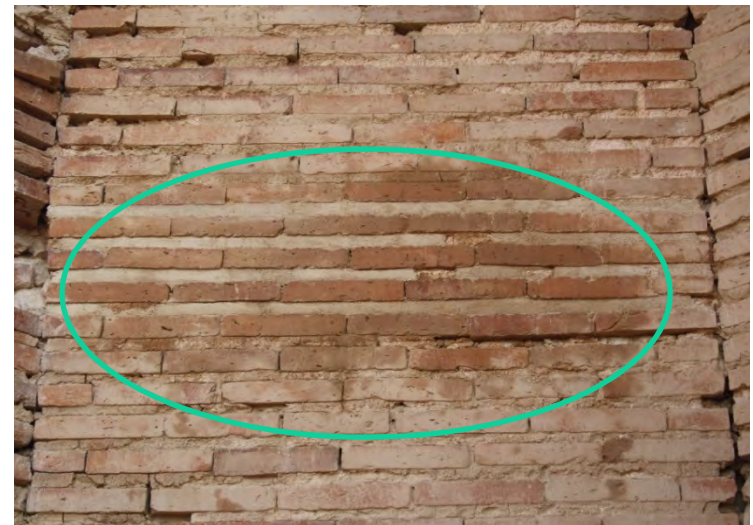
**East Elevation alcove deteriorated portion is considered to be the original portion and used to identify original brick work.**

- **Soft ochre colour with marks of wooden mould visible on the surface**
- **Straight edges (rather than rounded as in the case of later bricks), as brick is likely to have been left in mould to dry.**
- **Vertical joints show butt jointing with no mortar.**
- **Horizontal joints 1" wide square pointing recessed slightly from the face.**

### Mortar Features

**General colour: ochre-pinkish white**

**Use of fine gravel aggregate resulting from the type of sand used.**



# MASONRY CHARACTERISTICS – PHASE II

## PHASE II: British Restoration

Identified due to standard of brick masonry and mortar pointing - consist of 6-8 brick courses above stone skirting and. top 5-8 courses including 2 parapet courses.

- Maroon colour bricks
- Edges of bricks not as straight as bricks identified as original and does not carry wooden mould impression.
- At some places vertical joints have mortar, likely to have been due to spillage.
- Joints of same thickness as original but struck pointing with mortar recessed 1" from the face of brickwork.

## Mortar Features

- Colour varies from off white to white. Use of surkhi (brick dust) found on outermost façade and parapet masonry.
- Use of fine aggregate noticed.
- Use of cement found in some places notably rainwater drainage channels





# MASONRY CHARACTERISTICS – PHASE III

## PHASE III: Pakistan Period (1953)

Restoration mostly in outer vaulting, niches and façade identified due to brick and mortar treatment. Date recorded on some bricks.

- Red with yellowish tint; darker than original but lighter than British brick.
- High quality brick with straight edges; plain outer face with no wooden mould impression.
- Mortar present in vertical joints, contrary to original and British procedure.
- Joint size the same as original and British, but use of flushed pointing with no recess, making the masonry prominent compared to earlier periods

## Mortar Features

- Pinkish white to white
- Fine white mortar used between original bricks, when underpinning done.
- Use of cement found in mortar used in drainage channels.



## DAMAGES IDENTIFICATION - I

**Masonry Damage:** Various kind of damage have been identified due to varying kind of brick and pointing.

**Efflorescence:** Damage through surface salts leading to loss of brick surface.

**Sub-florescence:** White powder like fine dust on mortar surface, where fallen brick has exposed the inner layer of masonry.

**Pitting:** Dislodged bricks leaving a void for water ingress, thus damaging the integrity of the load bearing wall. Birds' nests and cobwebs have also caused damage.

**Spalling:** Found to be most prominent in the corner edges of external arches and vaults and around door and ventilator frames. Caused largely due to loss of glazed tiles, leaving edges of bricks vulnerable. Cavities aggravated due to nesting of squirrels and their burrows.





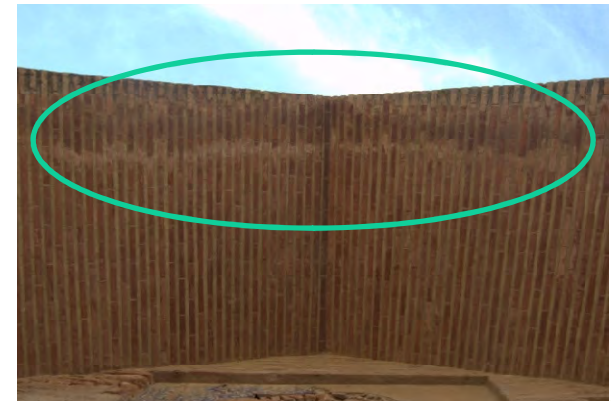
## DAMAGES IDENTIFICATION - II

**Weakened Masonry:** Found to be in areas above lintols and arches, due to settlement and weathering.

**Erosion:** Some bricks have been found to have lost the outer layer due to decades of weathering, the dry core turning into dust and leaving empty pockets of mortar.

**Moisture:** Water penetrating through mortar joints and cracks leading to discolouration of brick along outer edges of arches and openings. Lack of protective layer at parapet allows seepage of water from the top.

**Damage to Terracotta Tiles:** The internal floor tiles have suffered from loss of glazed surface.



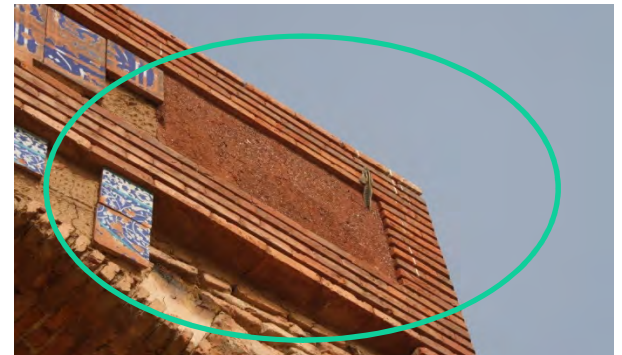
## DAMAGES IDENTIFICATION - III

**Loss and Recess of Mortar:** Due to varying levels of restoration at varying times, special care and treatment are required for conservation of masonry.

The mortar is found generally to be in a damaged condition, with loss of cushion and binding factor leads to loss of bricks; partial or complete disintegrated of mortar at the joints of brick and stone masonry, leaving crack-like spaces which harbour dampness, dust, spiders and ants, damaging the core.

**Loss of glazed tiles:** A major loss that impacts the visual character of the tomb, requiring careful consideration for its treatment.

**Deteriorated Stucco Work:** Detachment of stucco treatment and its loss is clearly visible. The treatment requires careful consideration due to implication to the presentation of interior space.





# CONDITION SURVEY GENERAL FINDINGS

- Lack of Maintenance – dry cleaning and graffiti removal required
- Various interventions in structure noted– 1950s, 1970s
- Deformation of internal and external dome
- Discoloration of brick and stone
- Brick voids
- Spalling of brick and stone
- Loss of pointing
- Collapse of brick masonry
- Hairline cracks along openings
- Damaged/missing plaster
- Damaged stone fretwork
- Damaged parapet at roof
- Efflorescence
- Damaged stone flooring
- Damaged stone cenotaphs
- Damaged/missing kashi tiles
- Damaged stucco
- Minimum traces of fresco



# TOMB OF SULTAN IBRAHIM

## *Folio X– Guiding Notes*



## SOUTH ELEVATION 021 – TOMB OF SULTAN IBRAHIM

### *Ventilator*

- The brick border needs to be cleaned and repaired.  
Underpinning required.
- Retrofitting of the wooden frame, placement of new *jali*

### *021.6e & 021.6c*

- Surface Cleaning
- Underpinning

### *d Level & 021.4g & 021.5g*

- This entire level is of Tile Mosaic Work and now the base mortar for the tiles is visible. The treatment needs to be identified.

### *b Level*

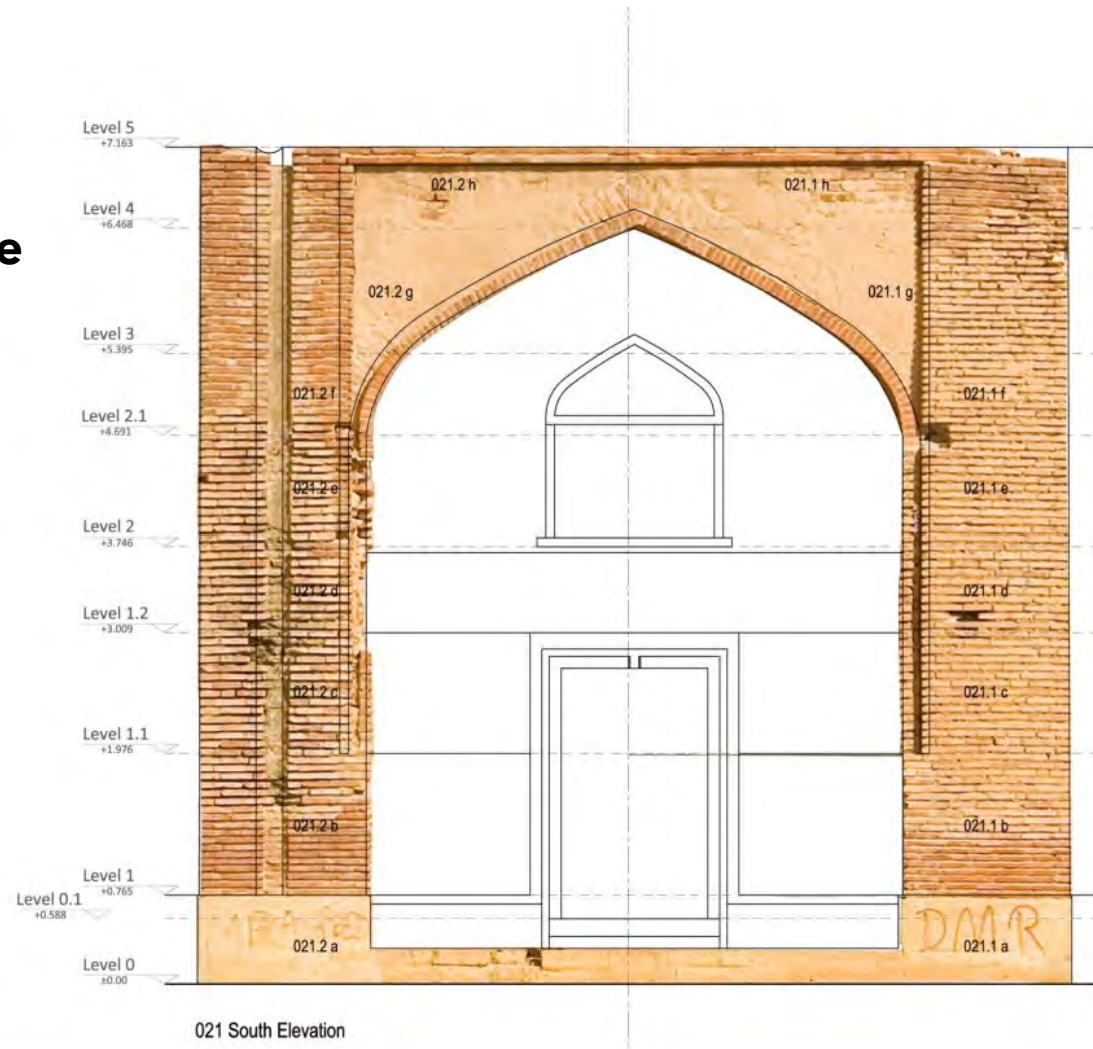
- Cleaning
- May be re-plastering / adding of sacrificial layer



## SOUTH ELEVATION 021 – TOMB OF SULTAN IBRAHIM

### *g & h Level*

- This entire level is of Tile Mosaic Work and now the base mortar for the tiles is visible. The treatment needs to be identified.
- Underpinning & Brick repairing
- The channel / surface groove needs to be treated

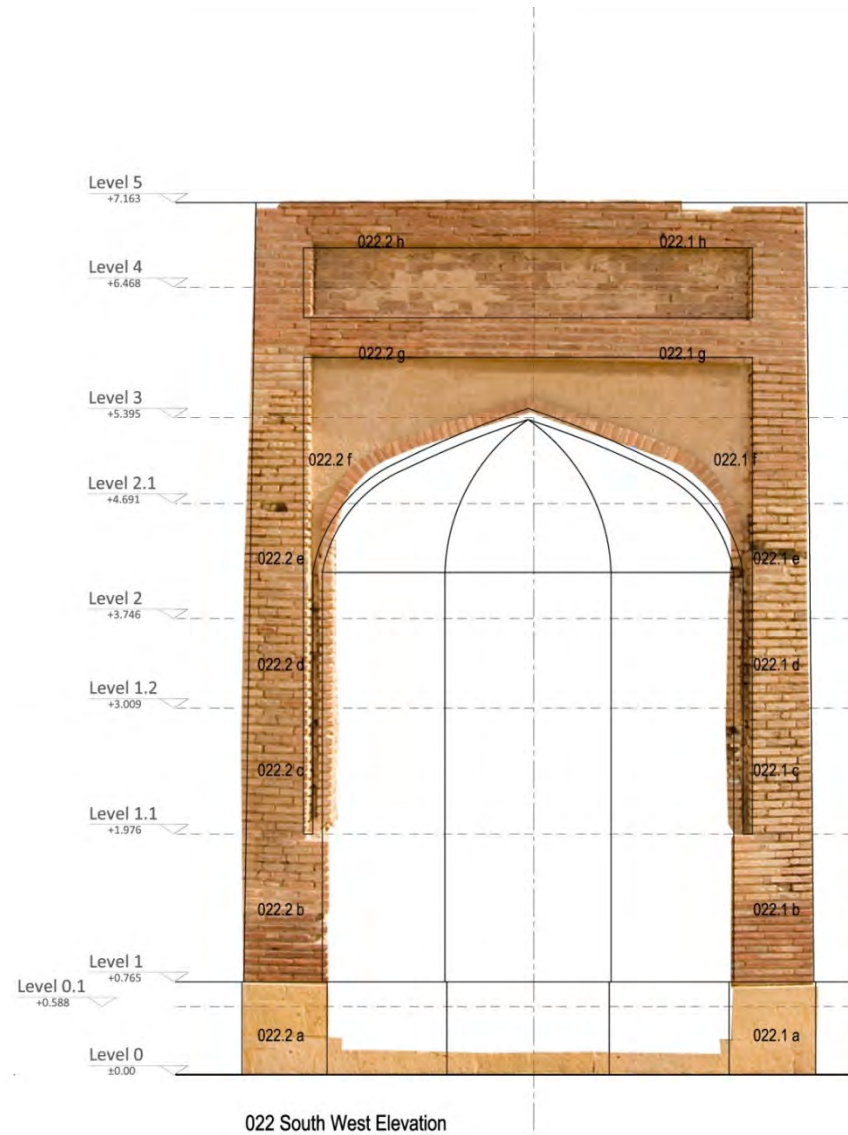




## SOUTH WEST ELEVATION 022 – TOMB OF SULTAN IBRAHIM

### *f & g & h Level*

- This entire level is of Tile Mosaic Work and now the base mortar for the tiles is visible. The treatment needs to be identified.
- Underpinning & Brick repairing
- Repairing of the top brick layer. Protective layer of mortar should be added to protect the wall core.



# WEST ELEVATION 023 – TOMB OF SULTAN IBRAHIM

## Ventilator

- The brick border needs to be cleaned and repaired. Underpinning required.
- Retrofitting of the wooden frame, placement of new *jali*

## d & g Level

- This entire level is of Tile Mosaic Work and now the base mortar for the tiles is visible. The treatment needs to be identified.
- Underpinning & Brick repairing

## b Level

- Cleaning, maybe re-plastering / adding of sacrificial layer
- Opening the access of the door by removing the stored stone slabs

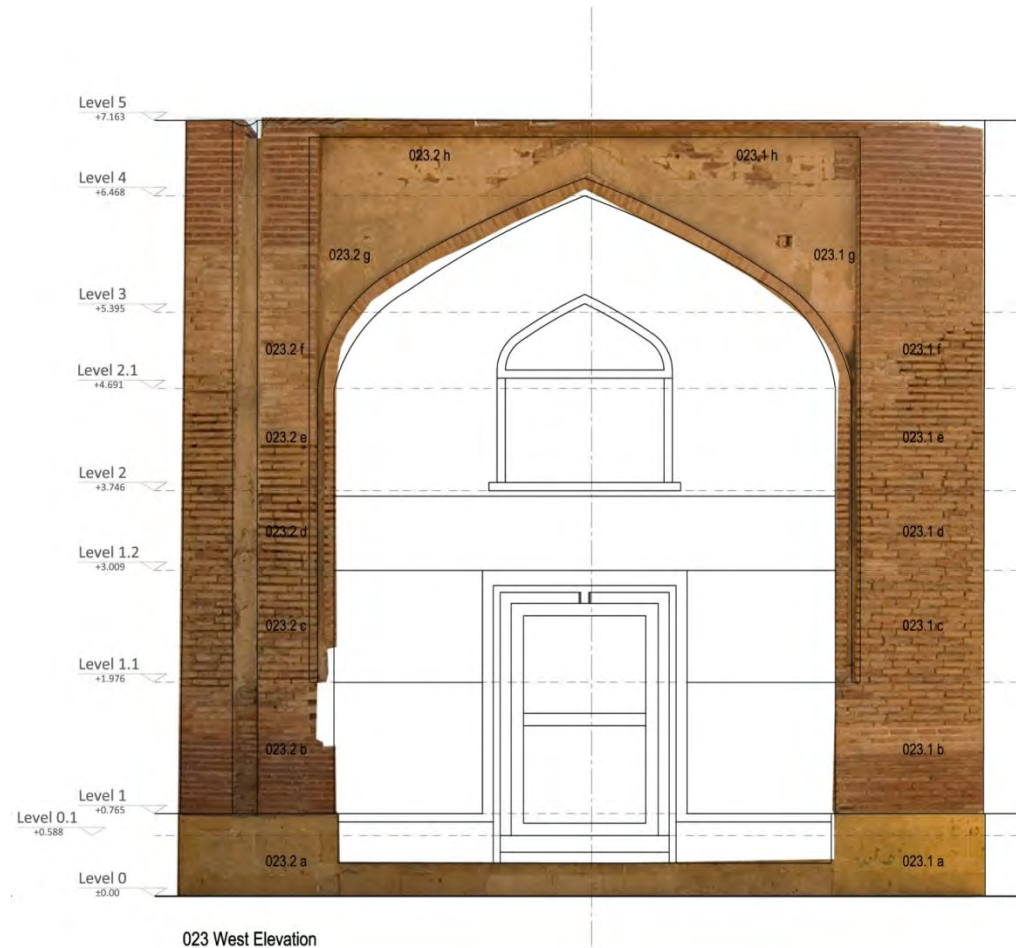


023 West Elevation

## WEST ELEVATION 023 – TOMB OF SULTAN IBRAHIM

### *g & h Level*

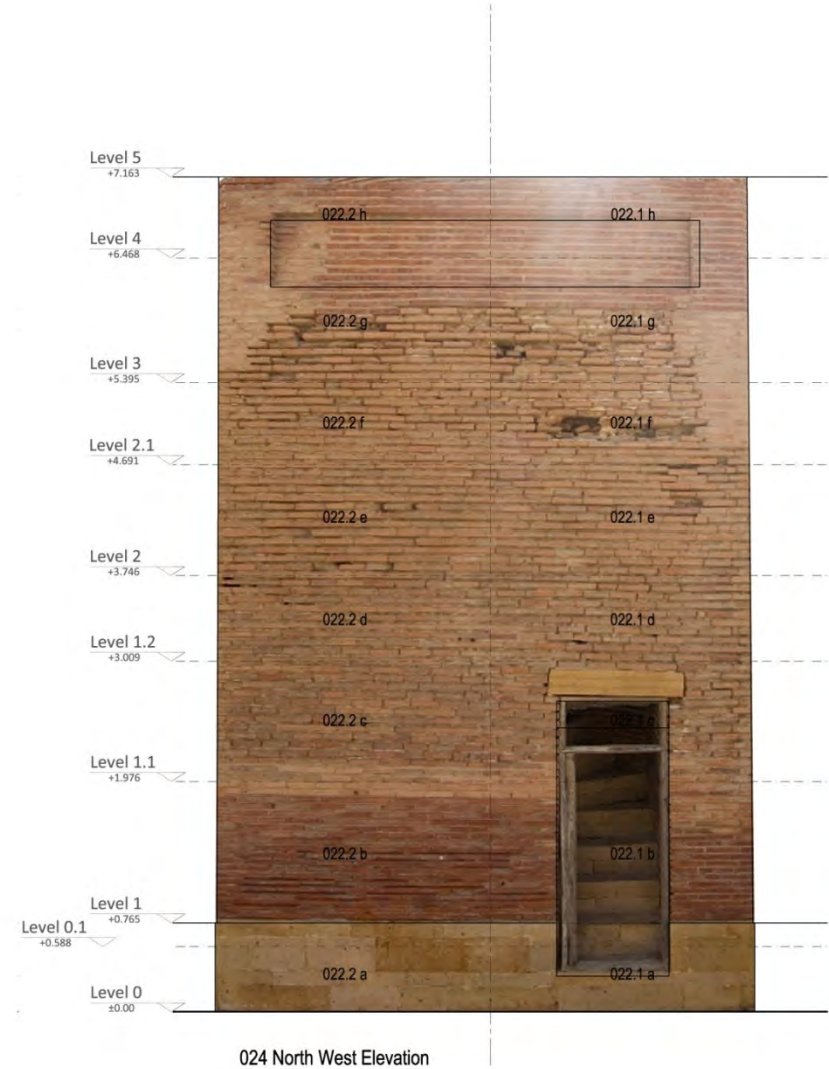
- This entire level is of Tile Mosaic Work and now the base mortar for the tiles is visible. The treatment needs to be identified.
- Underpinning & Brick repairing
- The channel / surface groove needs to be treated



# NORTH WEST ELEVATION 024 – TOMB OF SULTAN IBRAHIM

## *h Level*

- This entire level is of Tile Mosaic Work and now the base mortar for the tiles is visible. The treatment needs to be identified.
- Underpinning & Brick repairing
- Door needs to be retrofitted with new reinforcing joints and hinges. Wooden frame needs to be termite proofed / painted.
- The interior wall behind the staircase needs to be examined to assess the soundness of the staircase.





# NORTH ELEVATION 025 – TOMB OF SULTAN IBRAHIM

## Ventilator

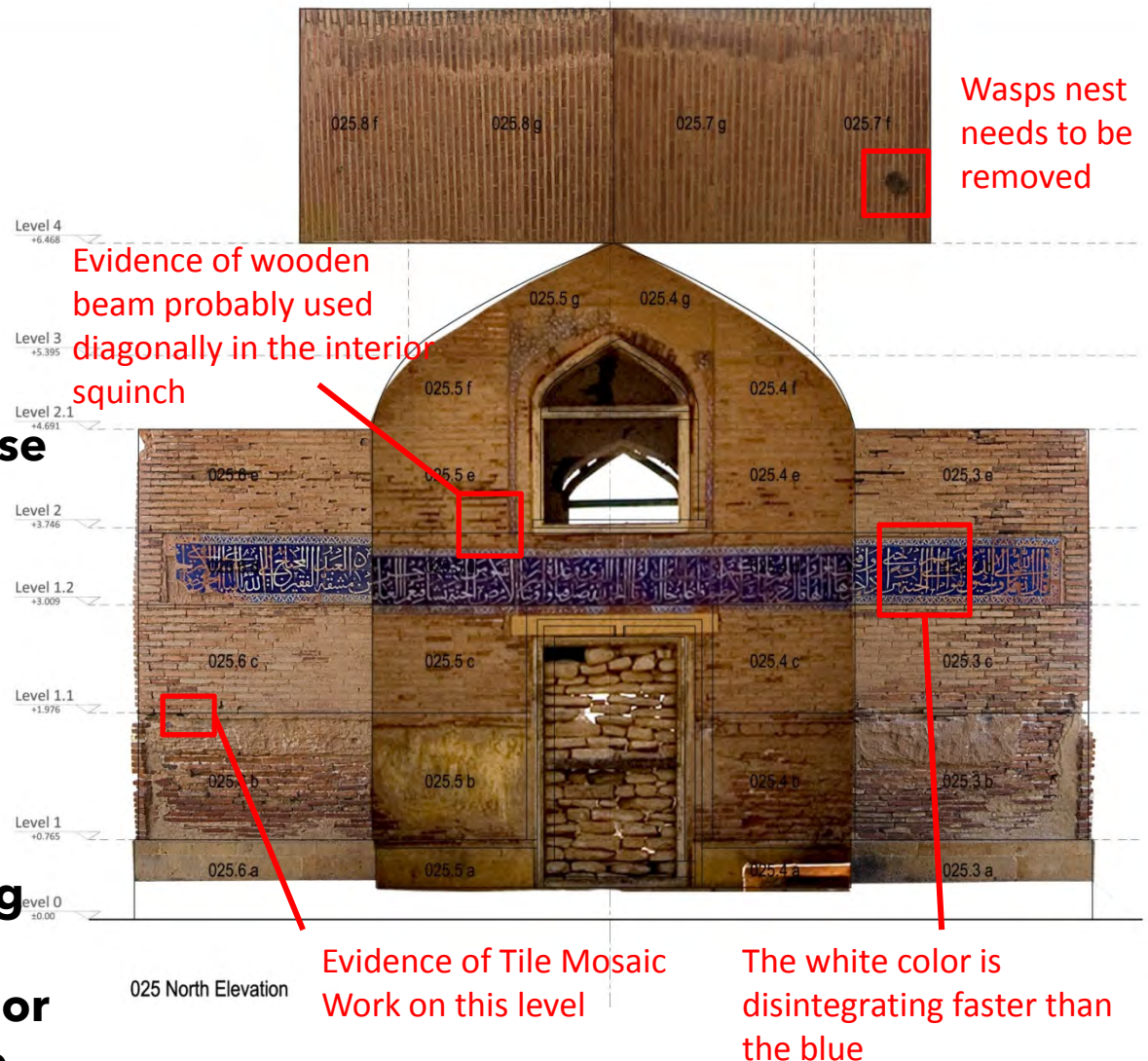
The brick border needs to be cleaned and repaired.  
Underpinning required.  
Retrofitting of the wooden frame, placement of new *jali*

## g Level

This entire level is of Tile Mosaic Work and now the base mortar for the tiles is visible.  
The treatment needs to be identified.  
Underpinning & Brick repairing

## b Level

Cleaning, maybe re-plastering / adding of sacrificial layer  
Opening the access of the door by removing the stored stone slabs



## NORTH ELEVATION 025 – TOMB OF SULTAN IBRAHIM

**This elevation has the most intact of the Tile Mosaic Work. Cleaning and stabilization of tiles is needed. Somebody needs to identify the verse for proper documentation and the calligraphic style used. I think it is THULUTH script developed in Shiraz, Iran, in the 11<sup>th</sup> Century.**

**The doorframe here is not of stone. The door lintel is also not original as it does not have any central projection like the rest.**

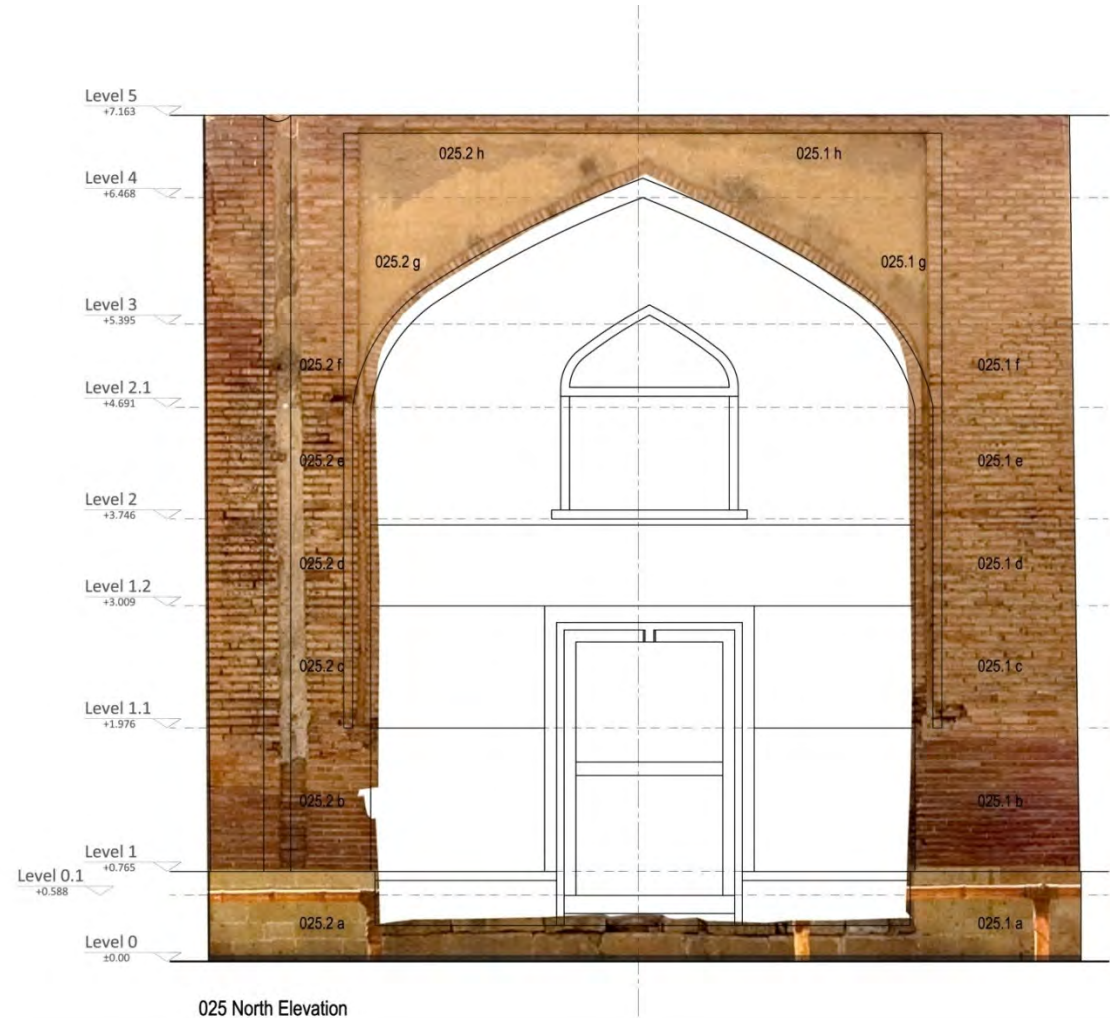




# NORTH ELEVATION 025 – TOMB OF SULTAN IBRAHIM

## *g & h Level*

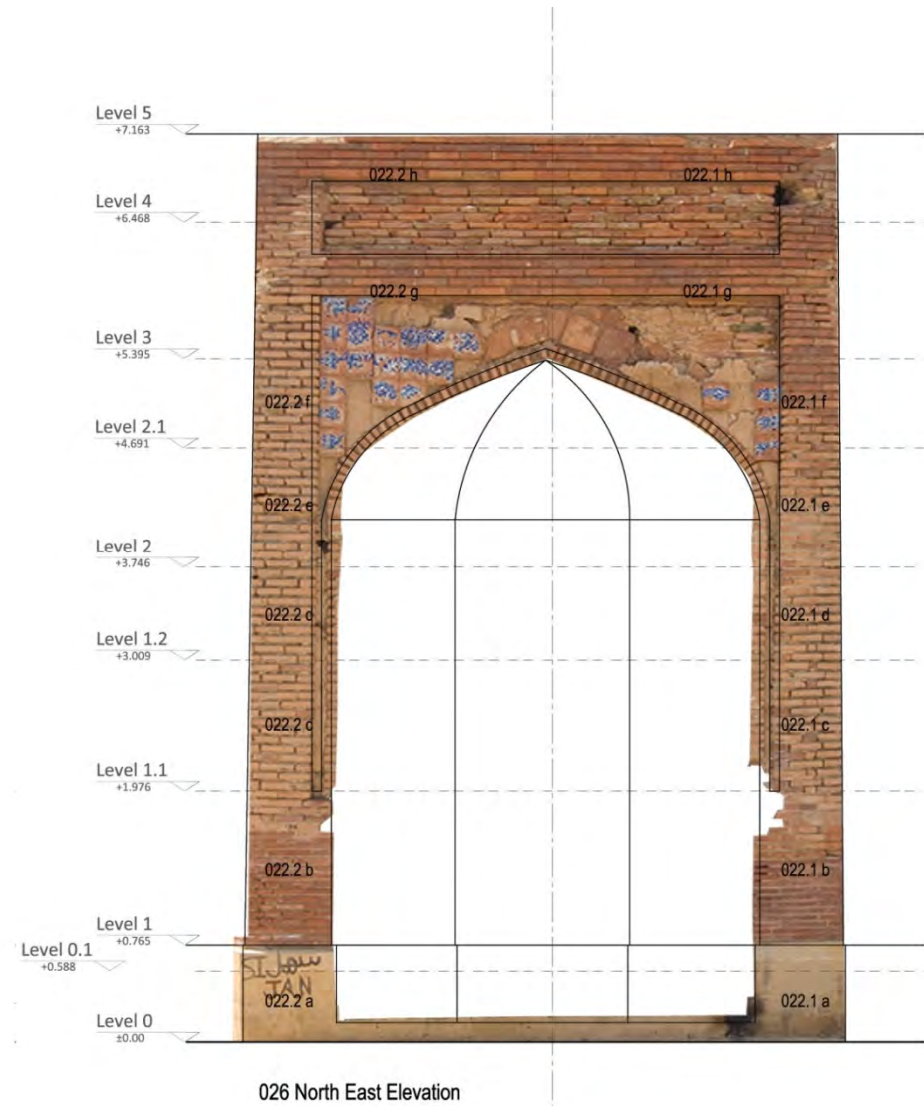
- This entire level is of Tile Mosaic Work and now the base mortar for the tiles is visible. The treatment needs to be identified.
- Underpinning & Brick repairing
- The channel / surface groove needs to be treated
- The stone base needs to be repaired.



## NORTH EAST ELEVATION 026– TOMB OF SULTAN IBRAHIM

### *f & g & h Level*

- This entire level is of Tile Mosaic Work and now the base mortar for the tiles is visible. The treatment needs to be identified.
- Underpinning & Brick repairing
- Repairing of the top brick layer. Protective layer of mortar should be added to protect the wall core.
- The remaining Mosaic Tiles need to be stabilized.
- Stone Cleaning





## EAST ELEVATION 027 – TOMB OF SULTAN IBRAHIM

### *Ventilator*

- The brick border needs to be cleaned and repaired.  
Underpinning required.
- Retrofitting of the wooden frame, placement of new *jali*

### *027.5g & 027.4g & d Level*

- This entire level is of Tile Mosaic Work and now the base mortar for the tiles is visible. The treatment needs to be identified.
- Tile Mosaic needs to be stabilized.
- Underpinning & Brick repairing  
*Also in 027.7g & 027.8g  
& 027.7f & 027.8f*



027 East Elevation

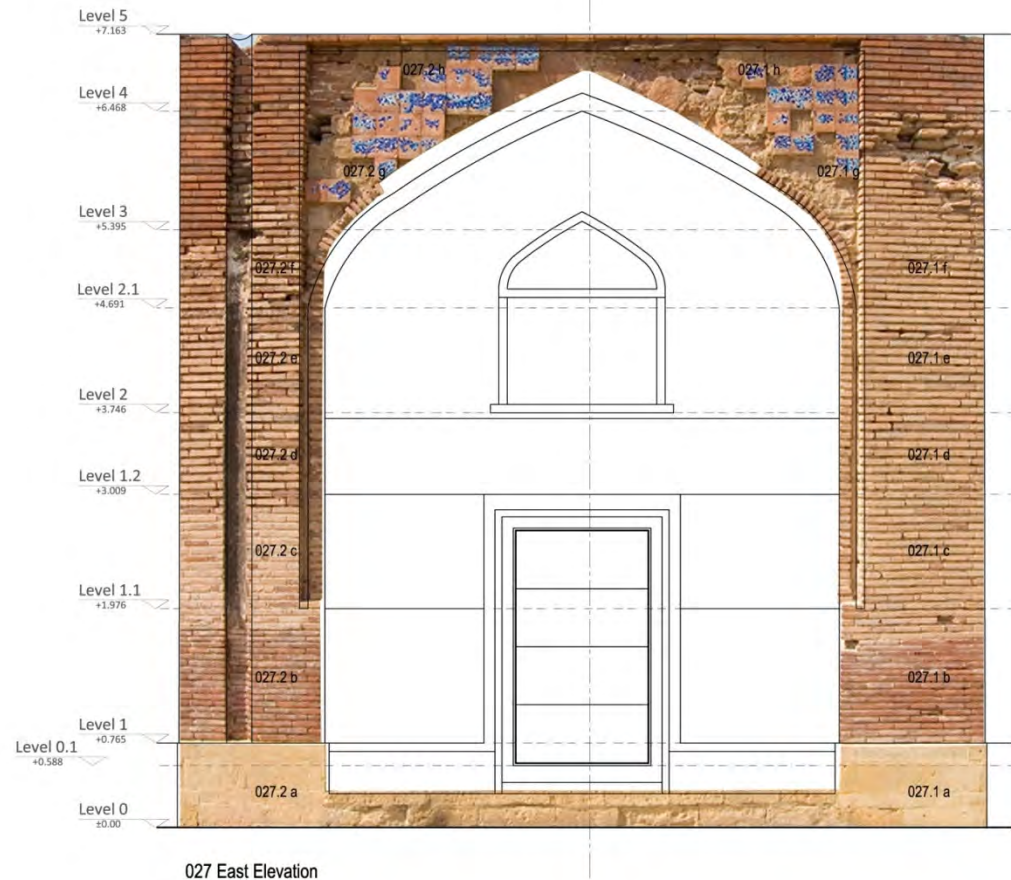
### *b Level*

- Cleaning, maybe re-plastering / adding of sacrificial layer

## EAST ELEVATION 027 – TOMB OF SULTAN IBRAHIM

### *g & h Level*

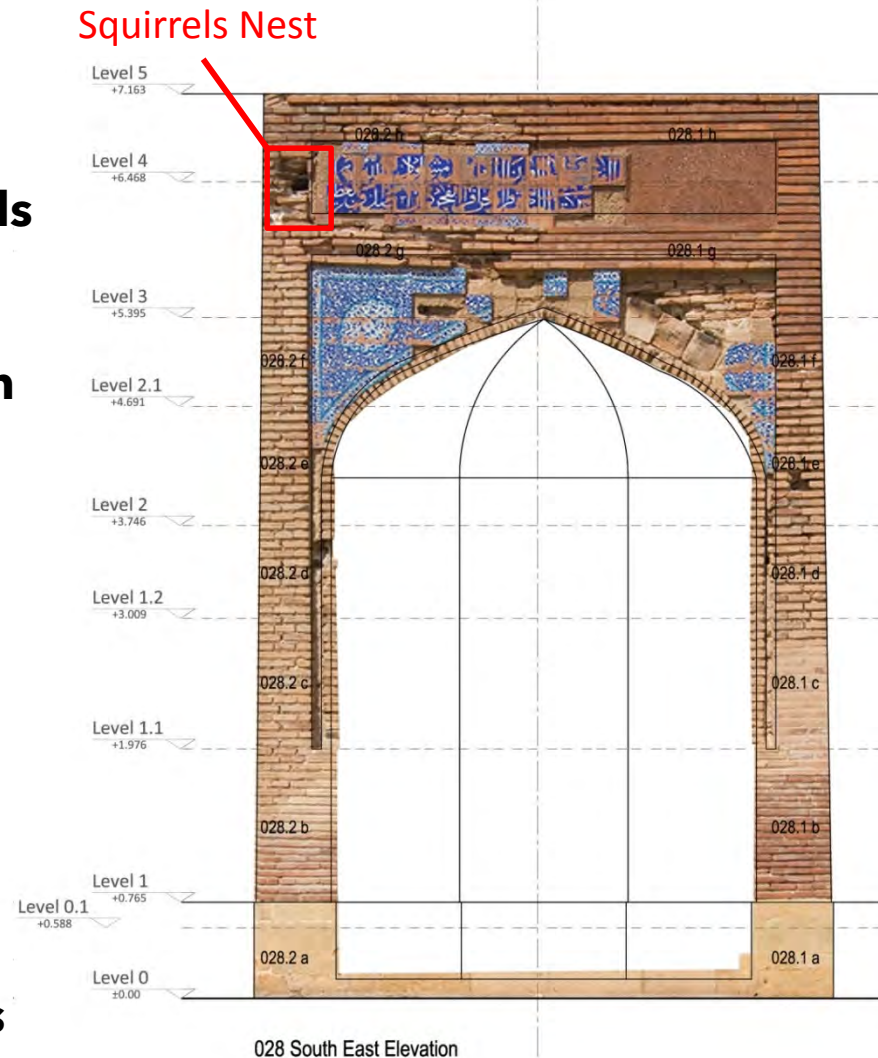
- This entire level is of Tile Mosaic Work and now the base mortar for the tiles is visible. The treatment needs to be identified.
- Remaining tiles needs to be stabilized.
- The pattern maybe documented as this is the only tiles available for this part.
- Underpinning & Brick repairing
- The channel / surface grove needs to be treated
- The stone base needs to be repaired.



## SOUTH EAST ELEVATION 024 – TOMB OF SULTAN IBRAHIM

### *f & g & h Level*

- This entire level is of Tile Mosaic Work and now the base mortar for the tiles is visible. The treatment needs to be identified.
- Stabilization of the remaining tiles. The pattern needs to be documented.
- Underpinning & Brick repairing
- Repairing of the top brick layer. Protective layer of mortar should be added to protect the wall core.
- The remaining Mosaic Tiles need to be stabilized.

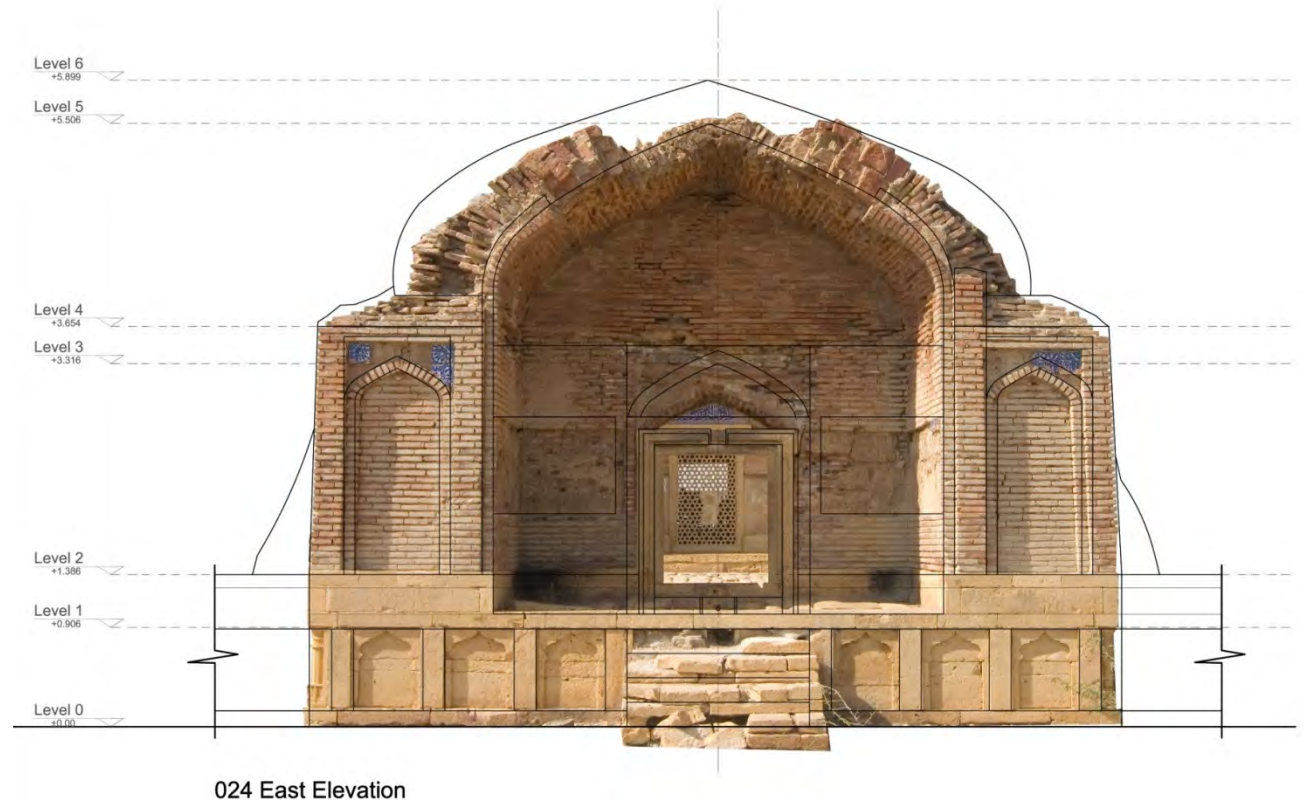




## NORTH WEST ELEVATION 024 – ARCHWAY

### *Openings*

The door frame of the entrance gateway does not fit the outer access ways vocabulary. These types of frames are only found in the internal openings and never as a main entrance. One of the doors in the main tomb is of wooden frame and it is safe to assume that this door frame has been removed from there to be fitted here later.



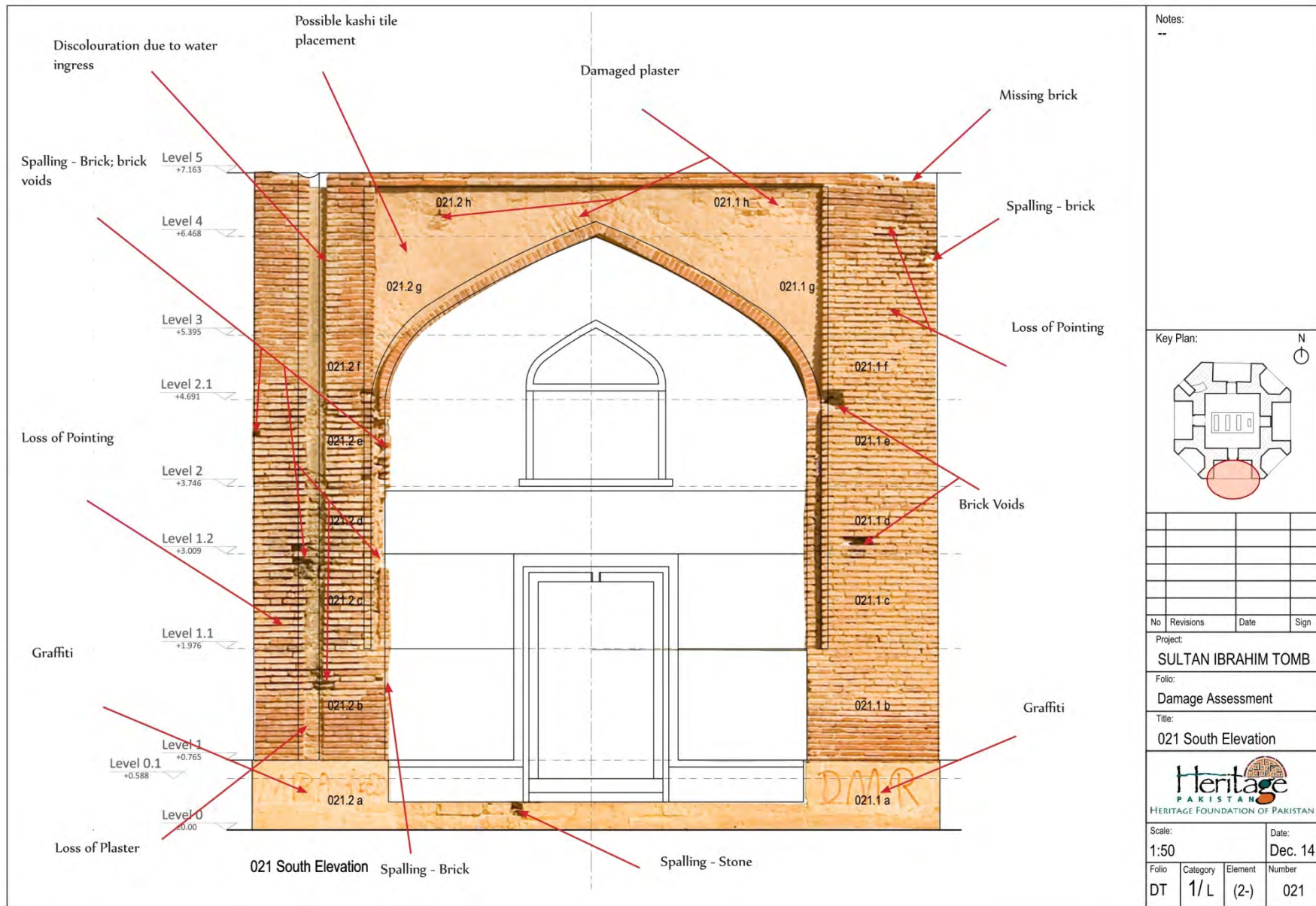


# TOMB OF SULTAN IBRAHIM

## *Folio X– Damage Assessment*

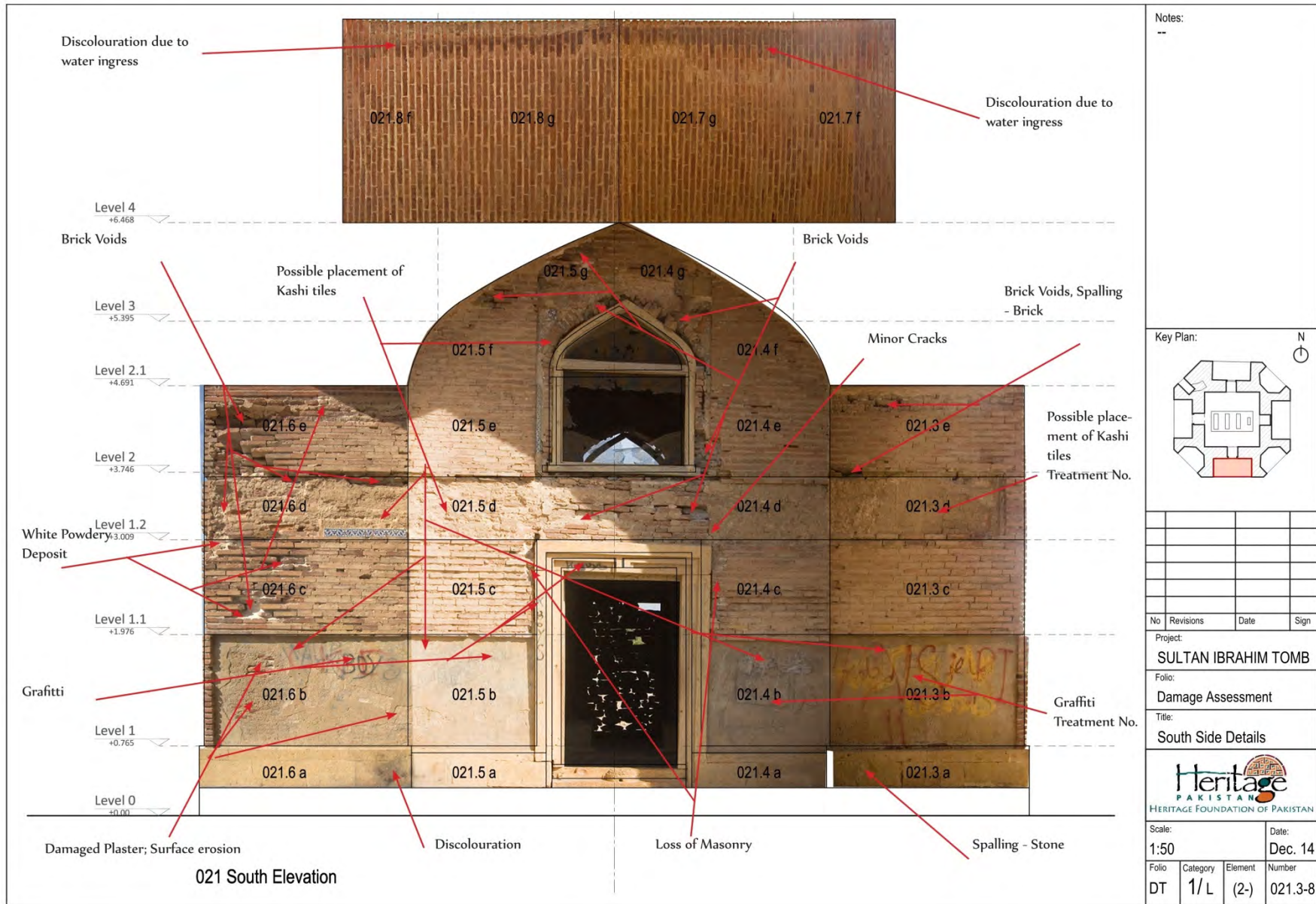


# SOUTH ELEVATION 021 – TOMB OF SULTAN IBRAHIM

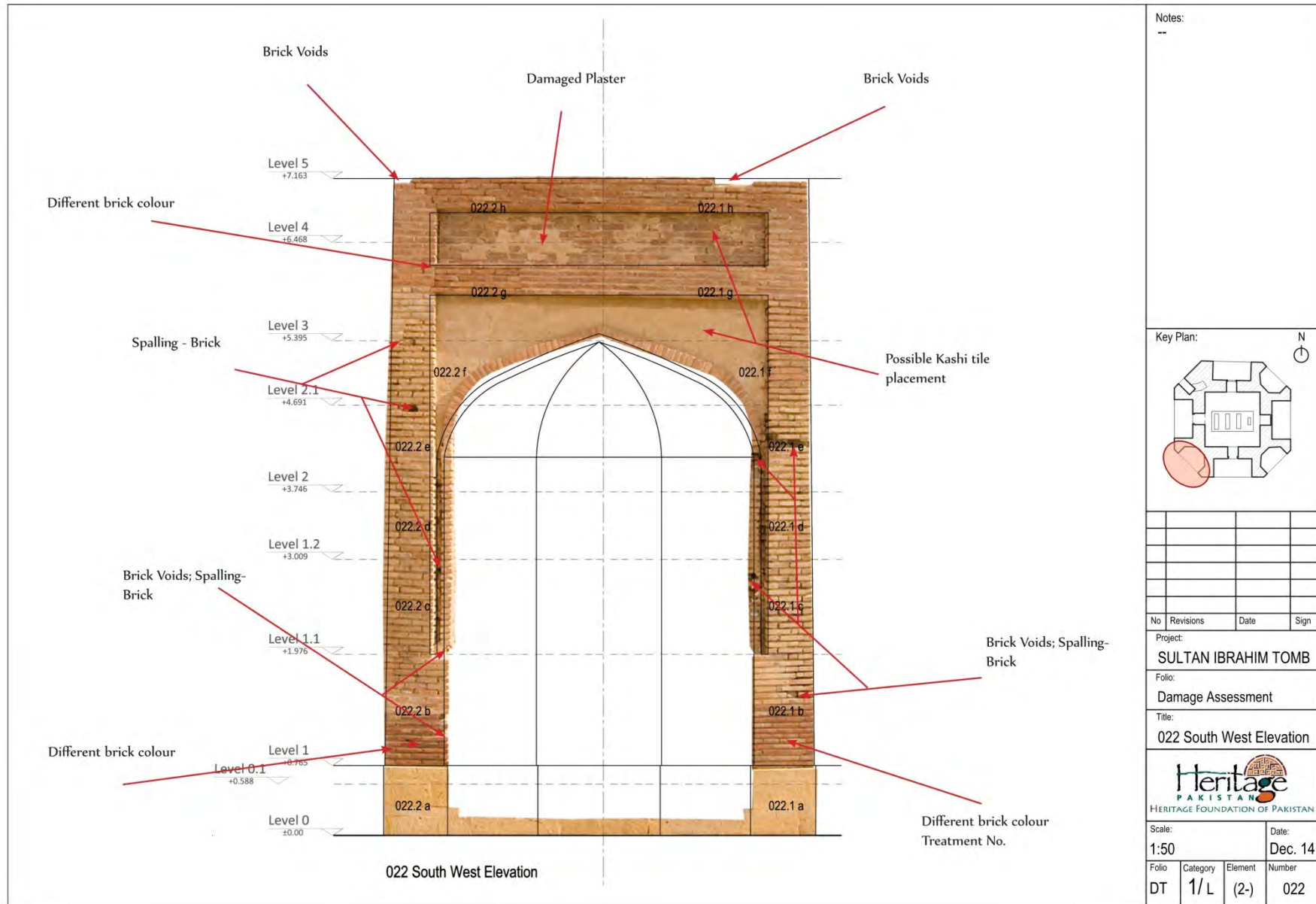




# SOUTH ELEVATION 021 – TOMB OF SULTAN IBRAHIM

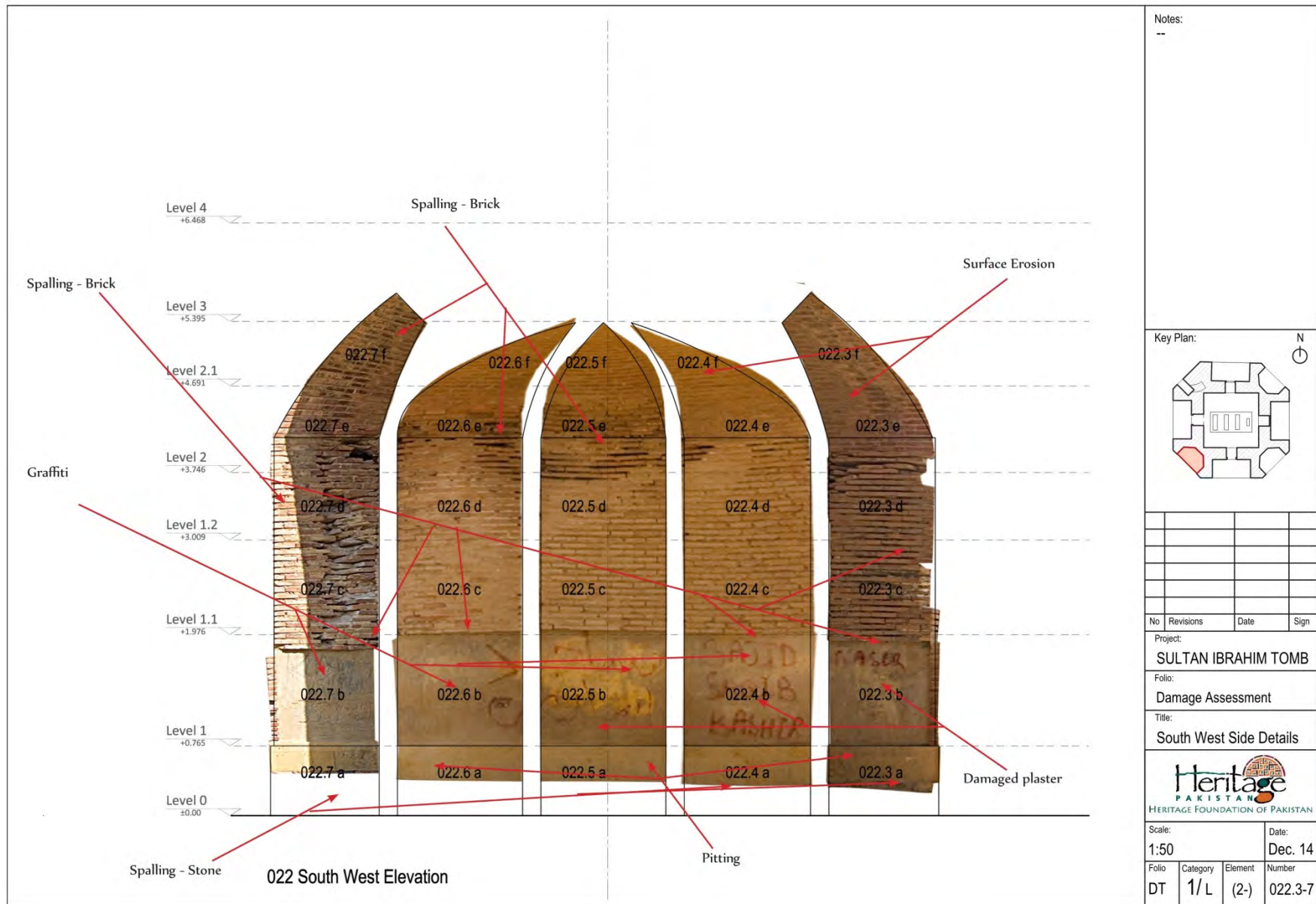


# SOUTH WEST ELEVATION 022 – TOMB OF SULTAN IBRAHIM



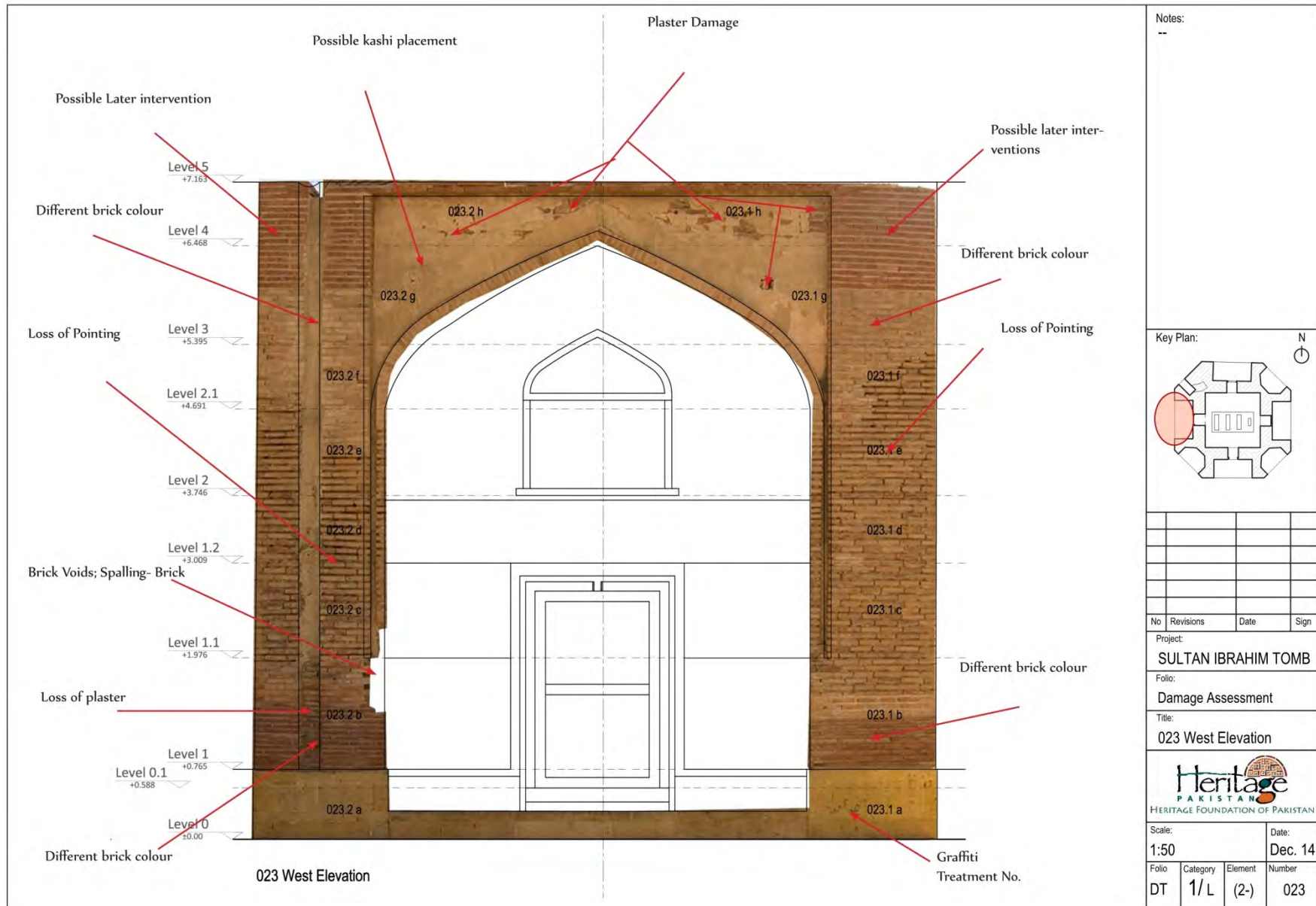


# SOUTH WEST ELEVATION 022 – TOMB OF SULTAN IBRAHIM

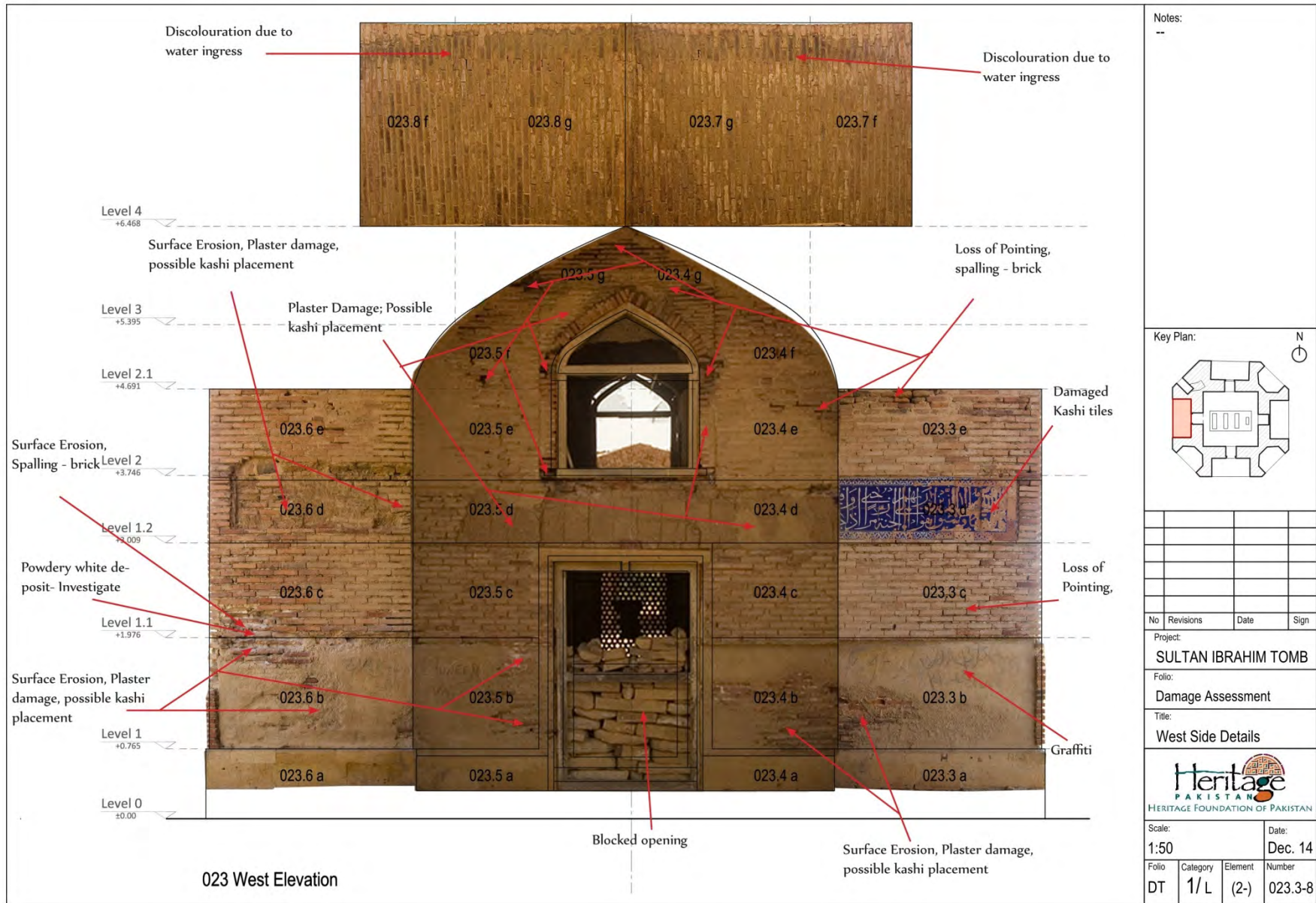




# WEST ELEVATION 023 – TOMB OF SULTAN IBRAHIM

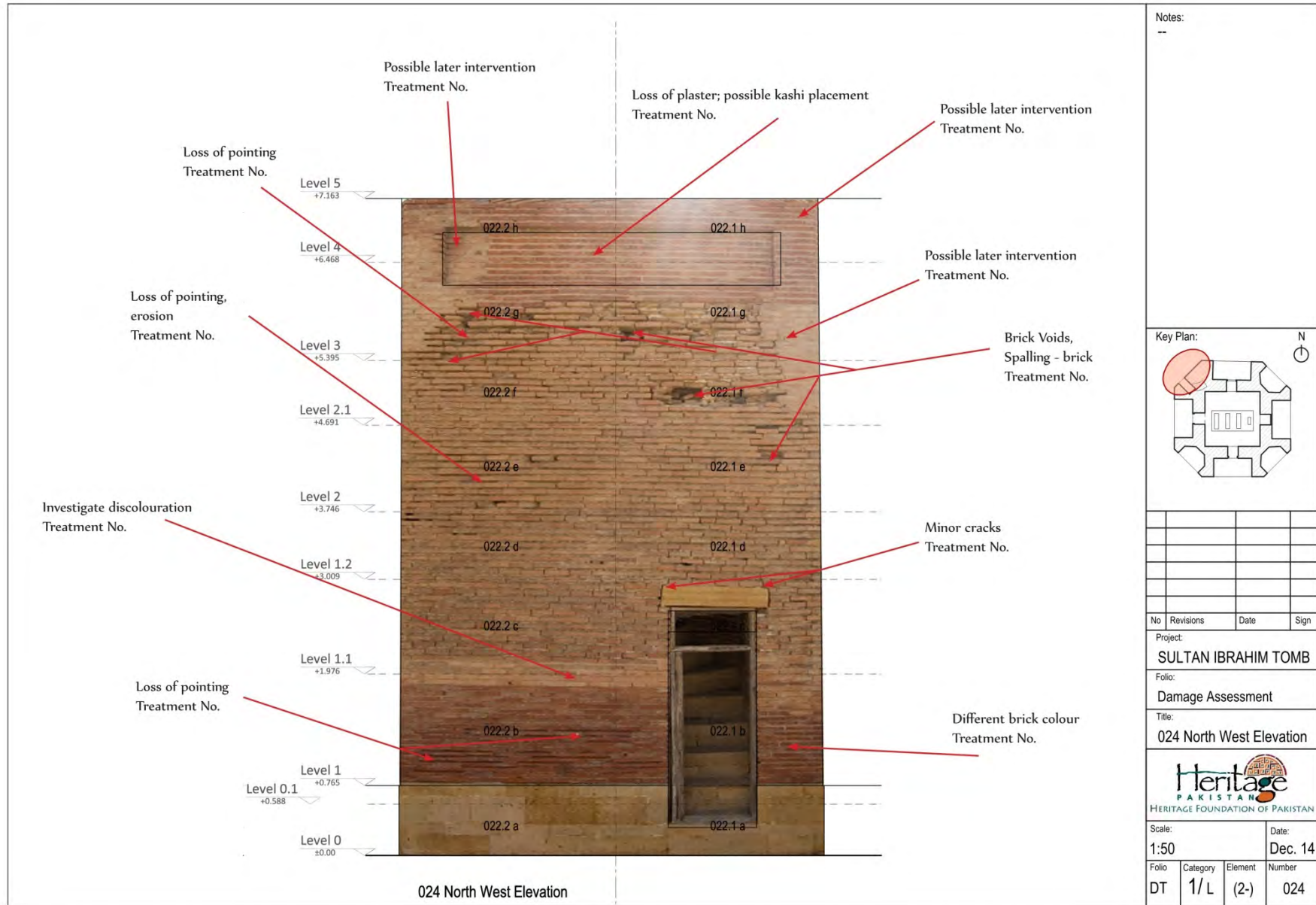


# WEST ELEVATION 023 – TOMB OF SULTAN IBRAHIM





# NORTH WEST ELEVATION 024 – TOMB OF SULTAN IBRAHIM





025 North Elevation

Level 5  
+7.163

Level 4  
+6.468

Level 3  
+5.395

Level 2.1  
+4.691

Level 2  
+3.746

Level 1.2  
+3.009

Level 1.1  
+1.976

Level 1  
+0.765

Level 0.1  
+0.588

Level 0  
±0.00

Spalling - Brick

Damaged plaster

Loss of Pointing

Brick Voids, Spalling - Brick

Stone discolouration

Spalling - Stone

Possible Kashi placement

Plaster discolouration

025.2 h

025.1 n

025.2 g

025.1 g

025.2 f

025.2 e

025.2 d

025.2 c

025.2 b

025.2 a

025.1 f

025.1 e

025.1 d

025.1 c

025.1 b

025.1 a

Surface erosion

Brick Voids, Spalling - Brick

Different brick colour

Stone discolouration; Spalling - Stone

Loss of pointing, damaged stone masonry

Key Plan:

No Revisions Date Sig

Project: SULTAN IBRAHIM TOMB

Folio: Damage Assessment

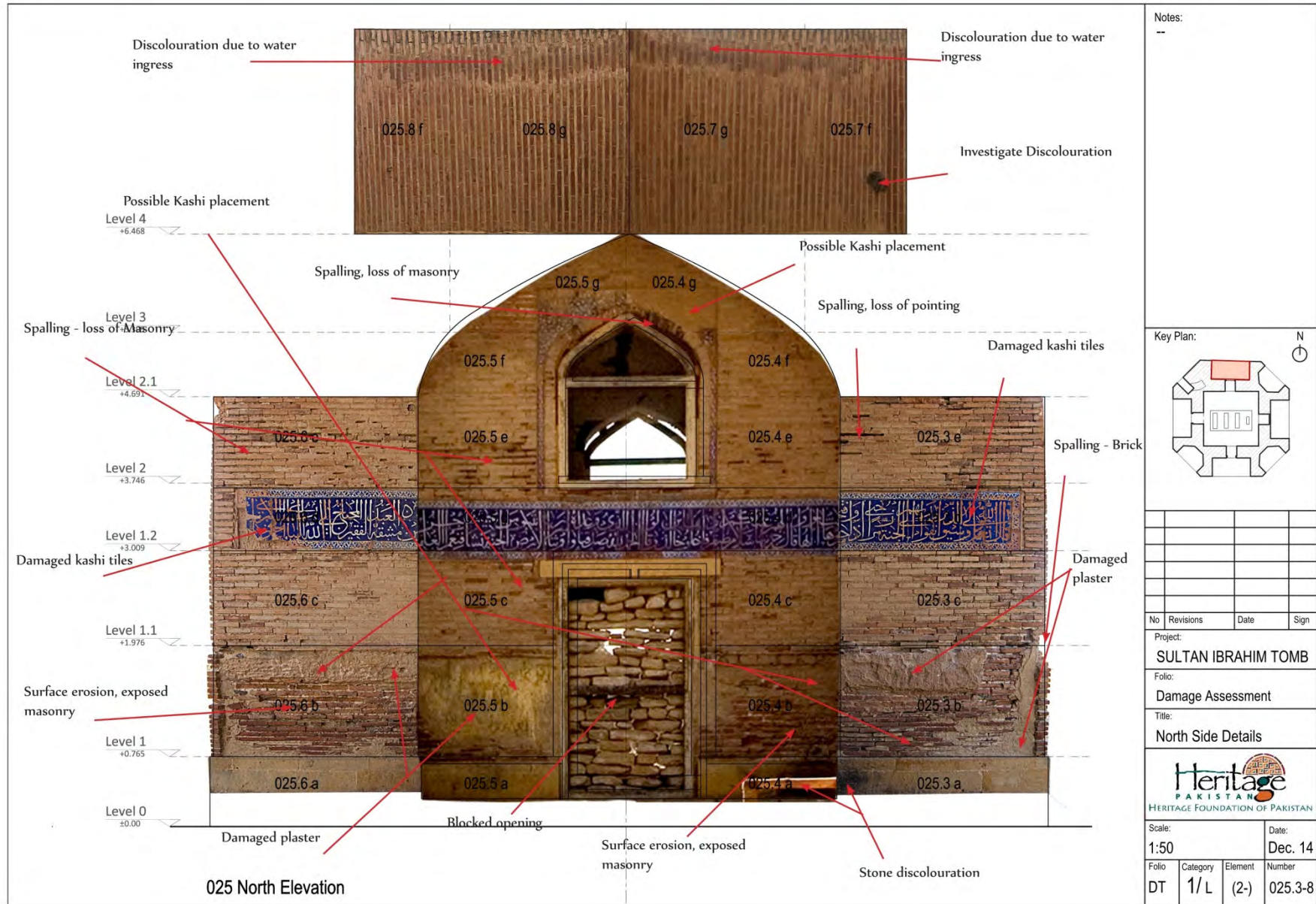
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Scale: 1:50

Date: Dec. 1

Folio	Category	Element	Number
DT	1/L	(2-)	025

# NORTH ELEVATION 021 – TOMB OF SULTAN IBRAHIM





**026 North East Elevation**

**Level 5** +7.163  
**Level 4** +6.468  
**Level 3** +5.395  
**Level 2.1** +4.691  
**Level 2** +3.746  
**Level 1.2** +3.009  
**Level 1.1** +1.976  
**Level 1** +0.765  
**Level 0.1** +0.588  
**Level 0** ±0.00

**Annotations:**  
 Possible Kashi placement  
 Spalling - brick  
 Brick Voids, Spalling - Brick  
 Damaged Kashi Tiles  
 Brick Voids  
 Surface erosion; damaged plaster; exposed masonry  
 Different brick colour  
 Loss of Pointing  
 Damaged Plaster  
 Spalling - Brick  
 Graffiti  
 Pitting - stone  
 Discolouration  
 Brick Voids; Spalling - Brick

**Key Plan:**

**Project:** SULTAN IBRAHIM TOMB  
**Folio:** Damage Assessment  
**Title:** 026 North East Elevation

**Heritage PAKISTAN**  
 HERITAGE FOUNDATION OF PAKISTAN

No	Revisions	Date	Sign

**Scale:** 1:50  
**Date:** Dec. 14

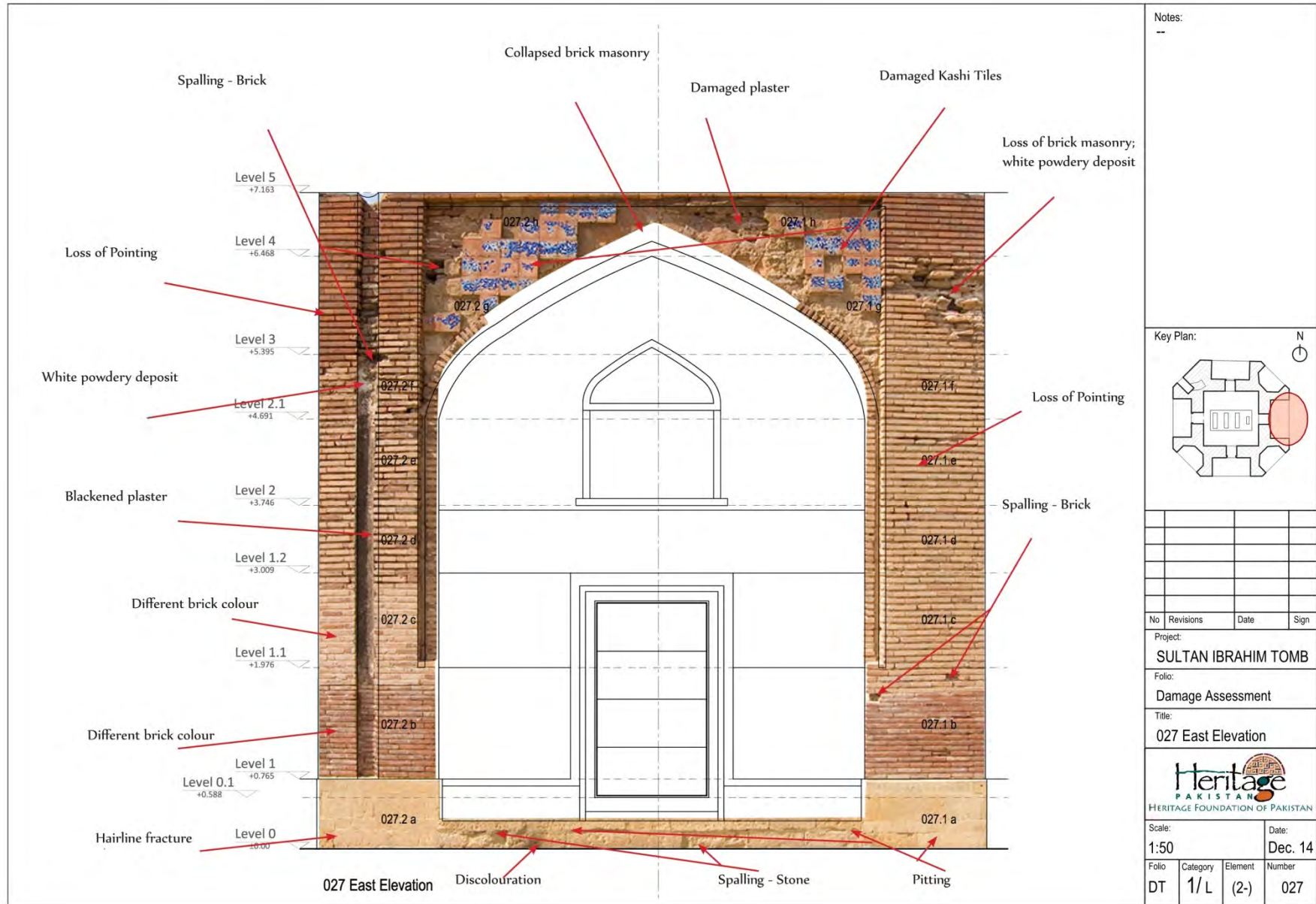
Folio	Category	Element	Number
DT	1/L	(2-)	026



# NORTH EAST ELEVATION 026 – TOMB OF SULTAN IBRAHIM



# EAST ELEVATION 027 – TOMB OF SULTAN IBRAHIM





027 East Elevation

Level 4  
+6.468

Level 3  
+5.395

Level 2.1  
+4.691

Level 2  
+3.746

Level 1.2  
+3.009

Level 1.1  
+1.976

Level 1  
+0.765

Level 0  
±0.00

Exposed masonry

Loss of surface masonry

Possible Kashi placement

Damaged Kashi tiles

Loss of Masonry; Spalling

Damaged Plaster

Loss of Pointing

Minor cracks

Graffiti

Surface erosion, Exposed masonry

Spalling - Stone

White deposit

Damaged Stone Fretwork

Spalling - Stone

027.8 f

027.6 g

027.7 g

027.7 f

027.6 e

027.5 f

027.5 e

027.4 f

027.4 e

027.6 a

027.4 d

027.6 c

027.5 c

027.4 c

027.3 c

027.6 b

027.5 b

027.4 b

027.3 b

027.6 a

027.5 a

027.4 a

027.3 a

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[illegible]

No	Revisions	Date	Signature
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Project:			
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SULTAN IBRAHIM TOME

Folio:

### Damage Assessment

Title:

### East Side Details



Part:	
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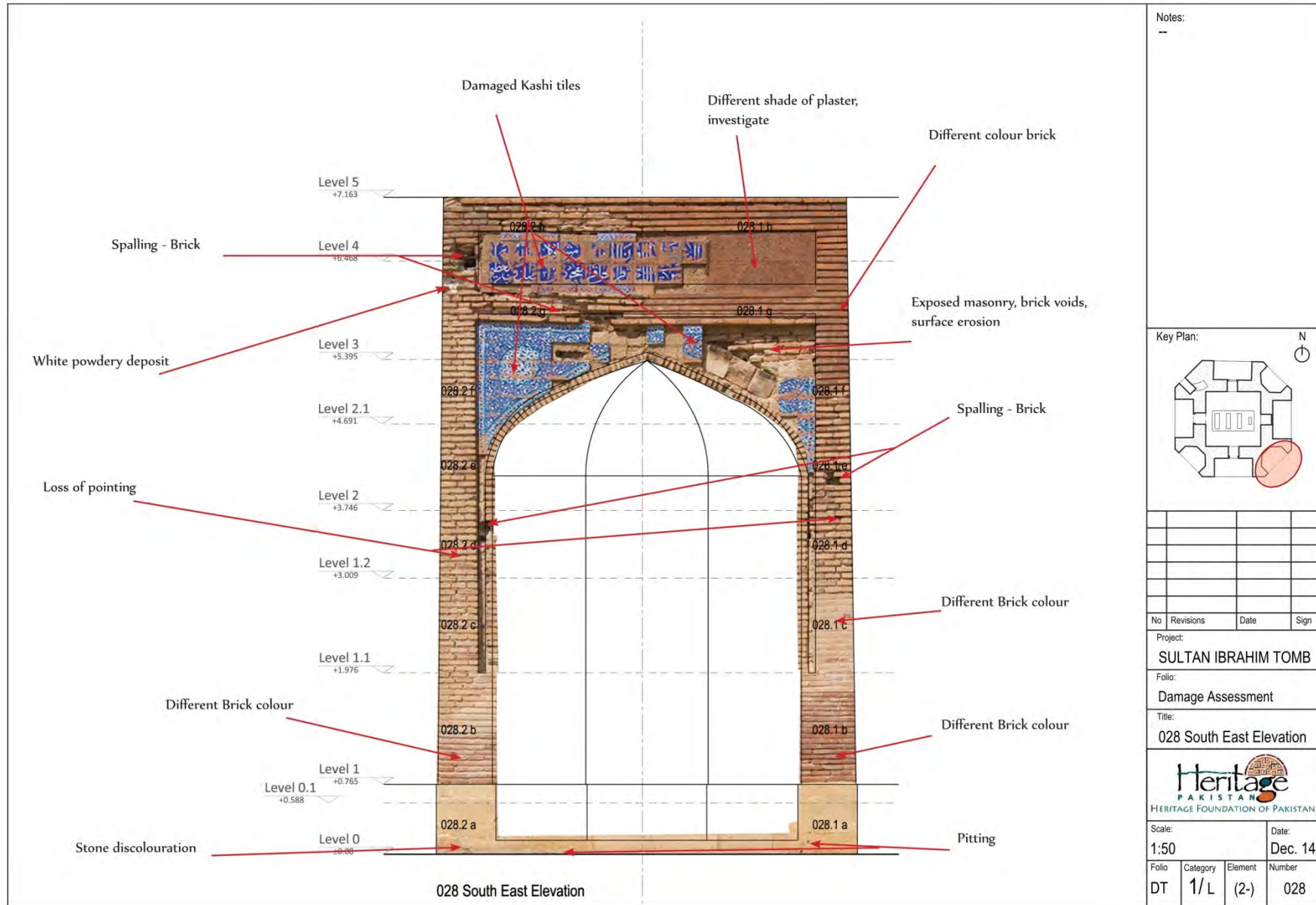
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1:50	Dec 1

Folio	Category	Element	Number
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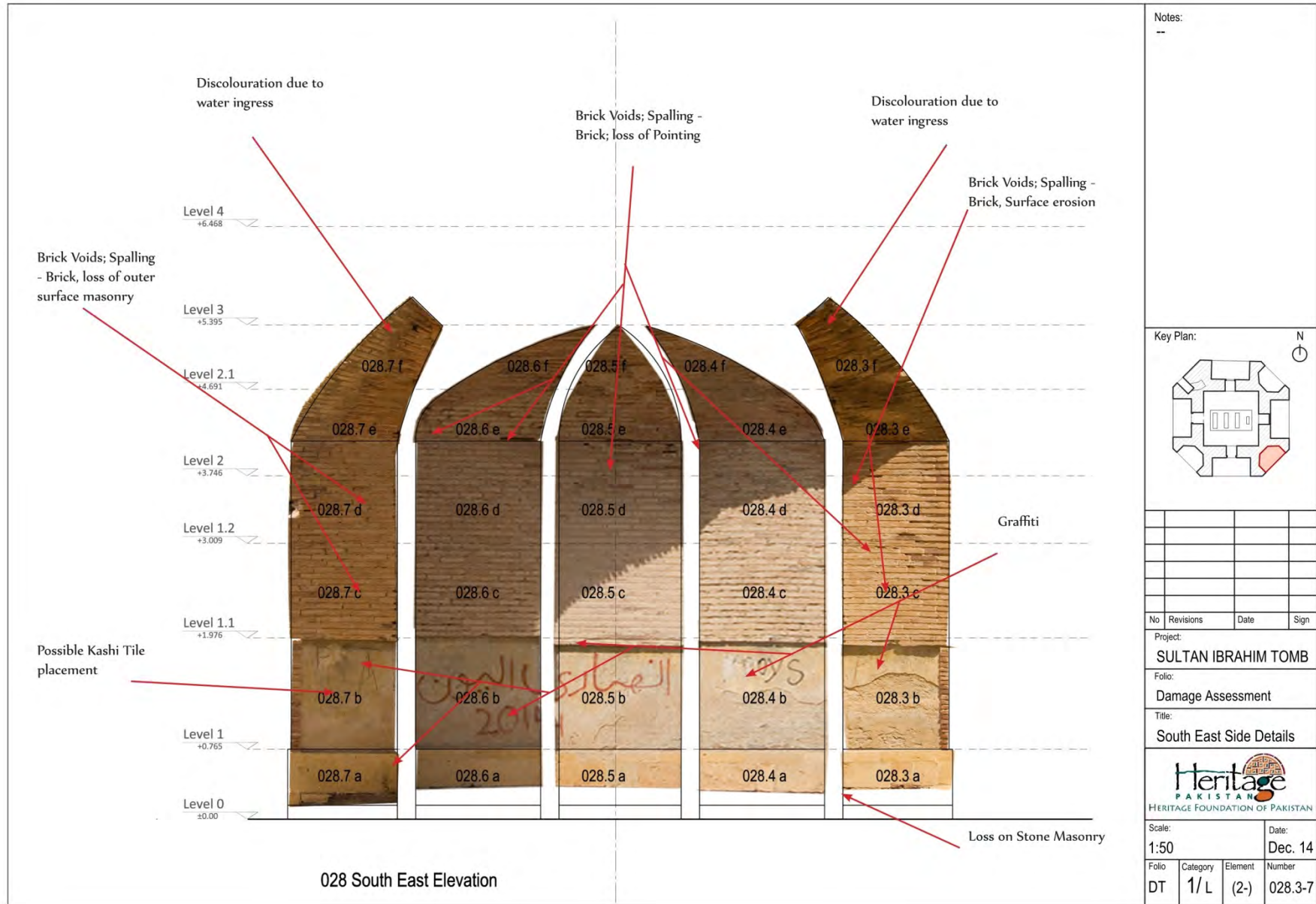
DT	1/L	(2-)	027.3-
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# SOUTH EAST ELEVATION 028 – TOMB OF SULTAN IBRAHIM

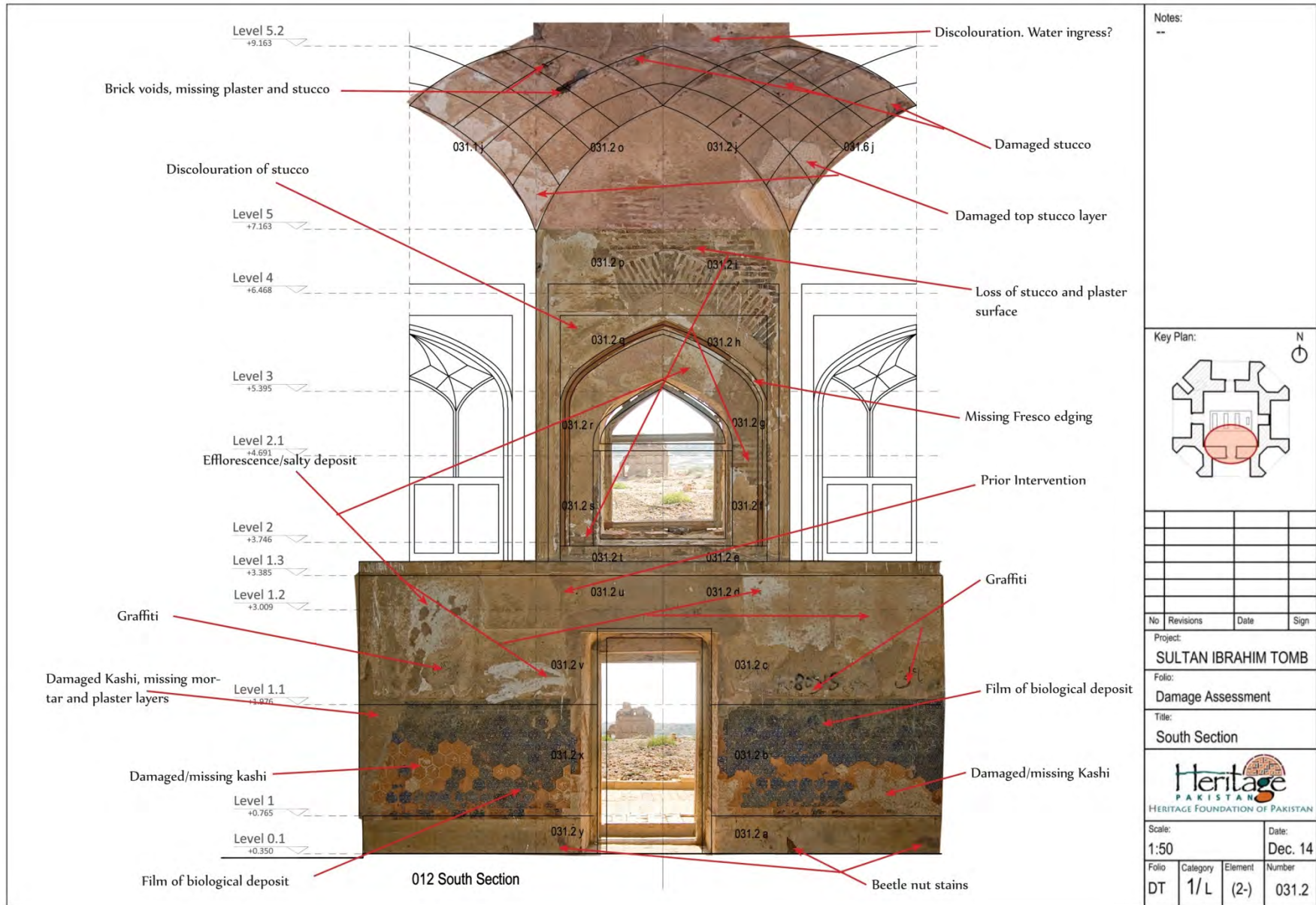


# SOUTH EAST ELEVATION 028 – TOMB OF SULTAN IBRAHIM



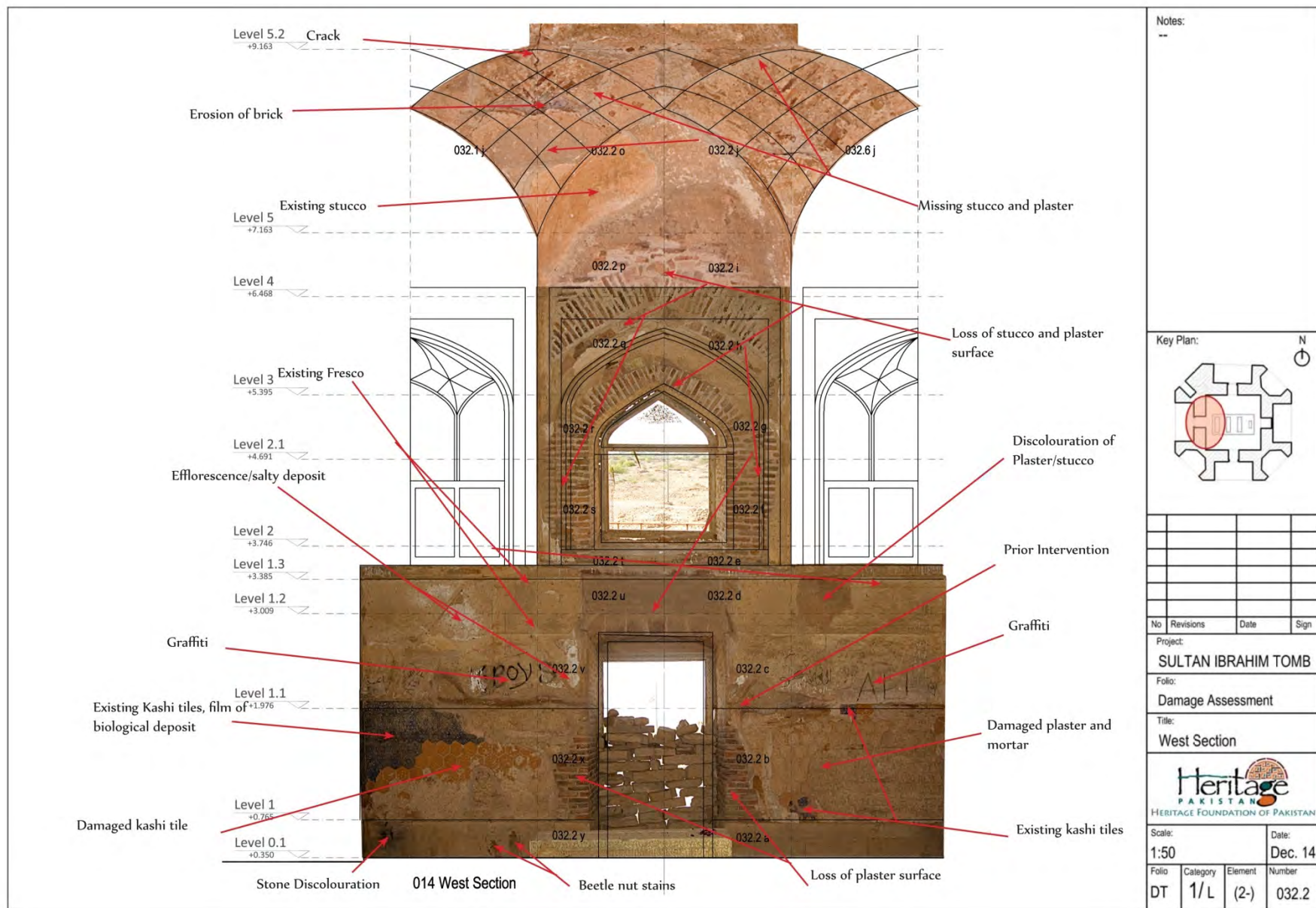


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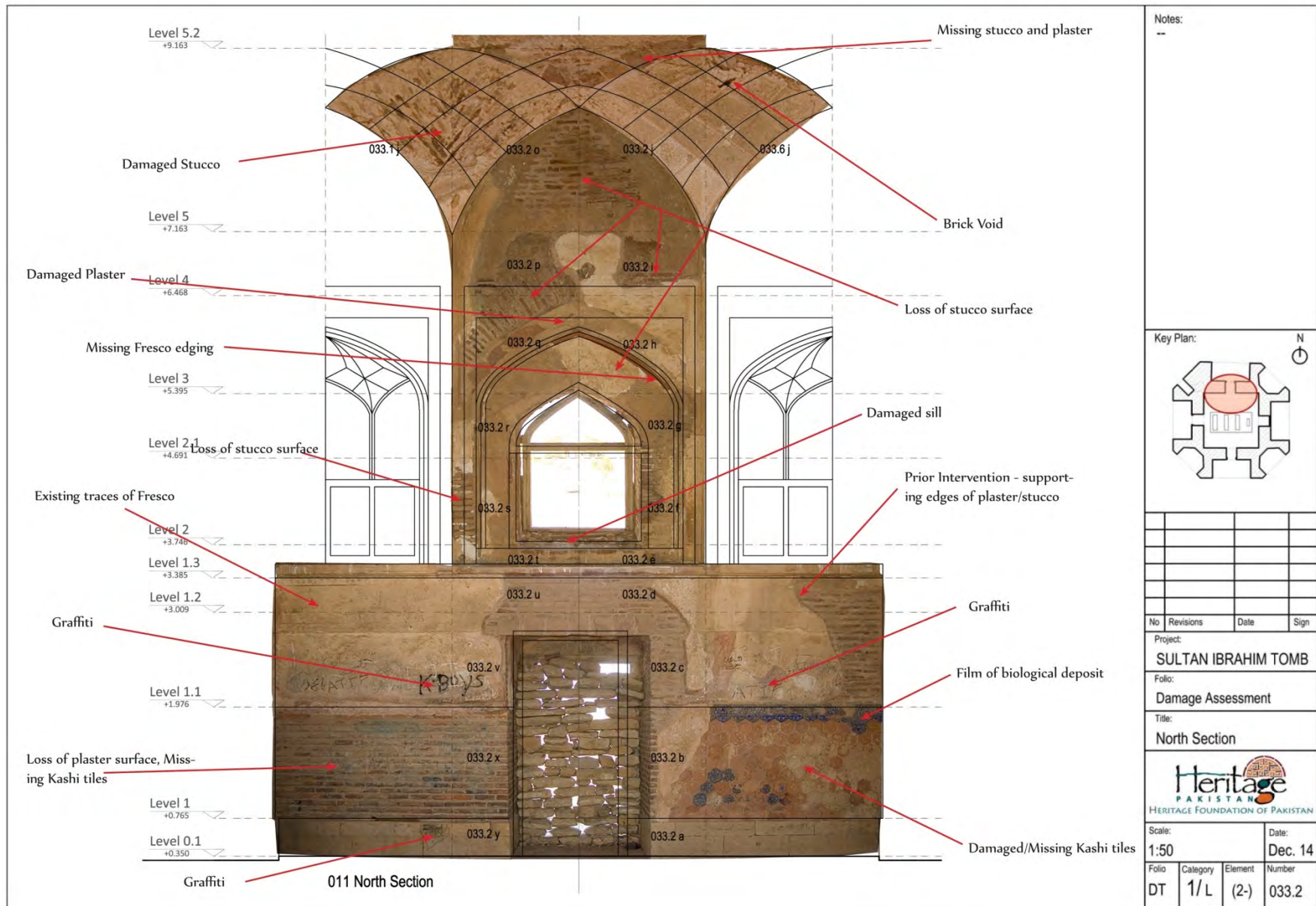




# WEST ELEVATION 032 – TOMB OF SULTAN IBRAHIM

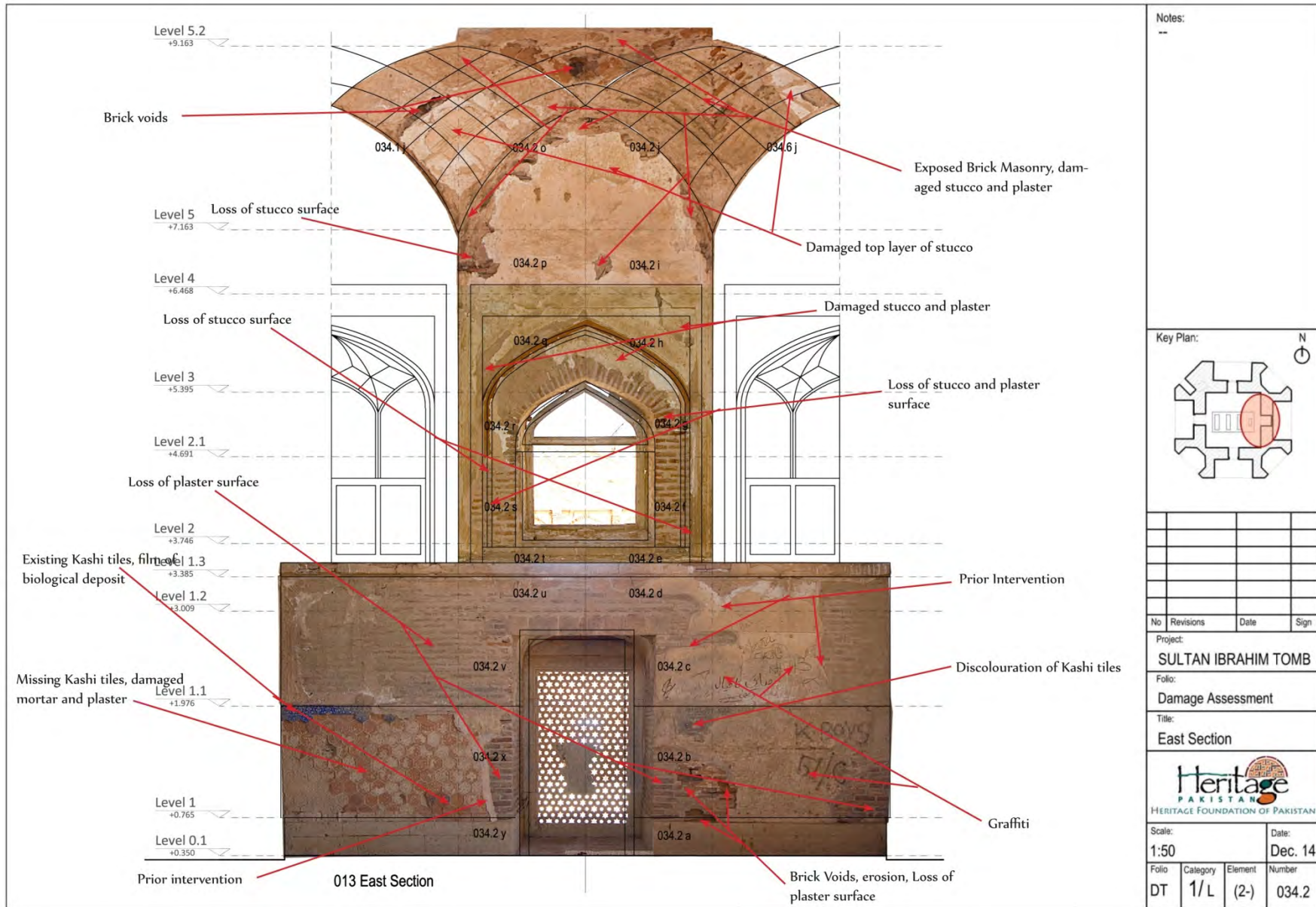


# NORTH ELEVATION 033 – TOMB OF SULTAN IBRAHIM



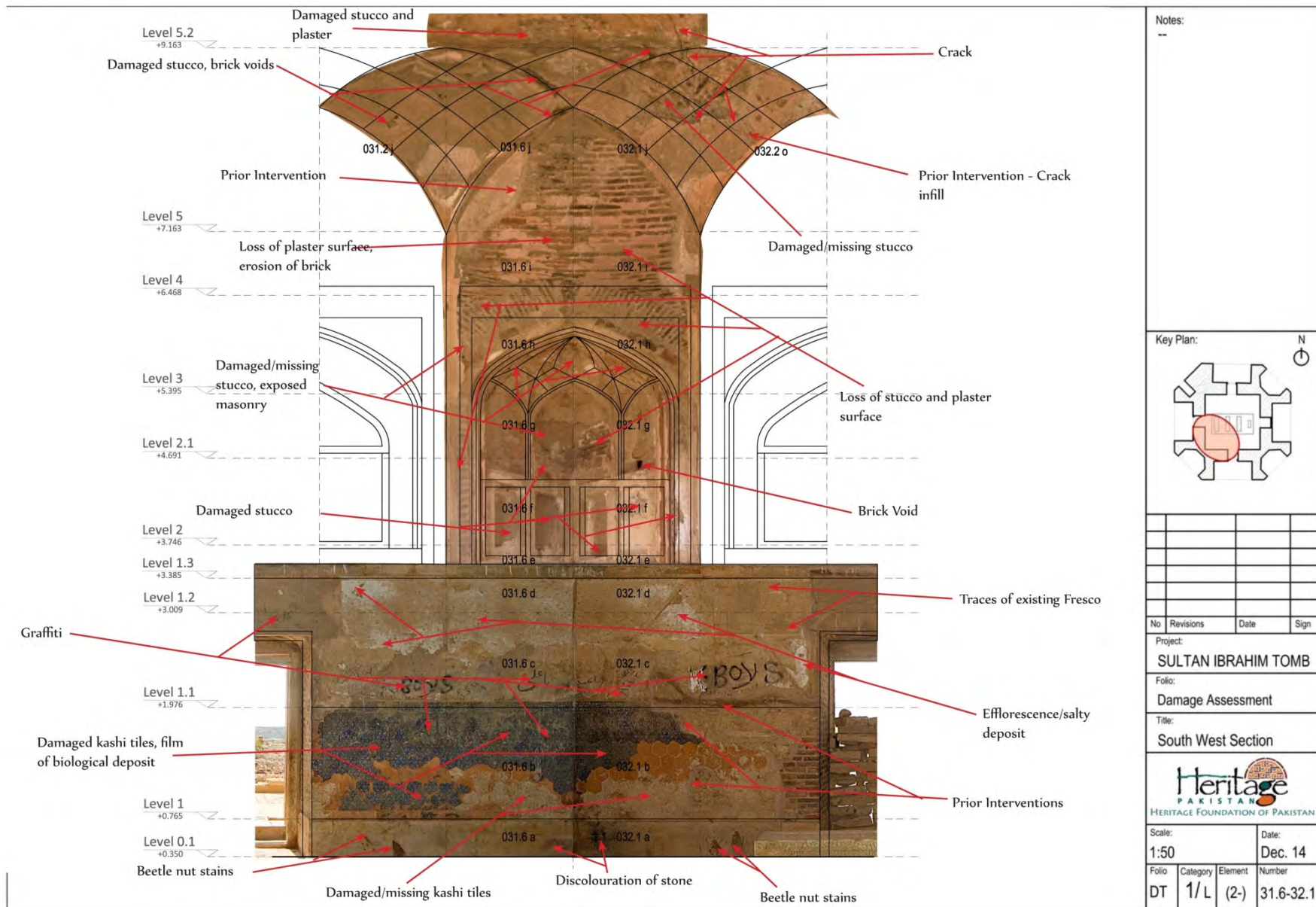


# EAST ELEVATION 034 – TOMB OF SULTAN IBRAHIM

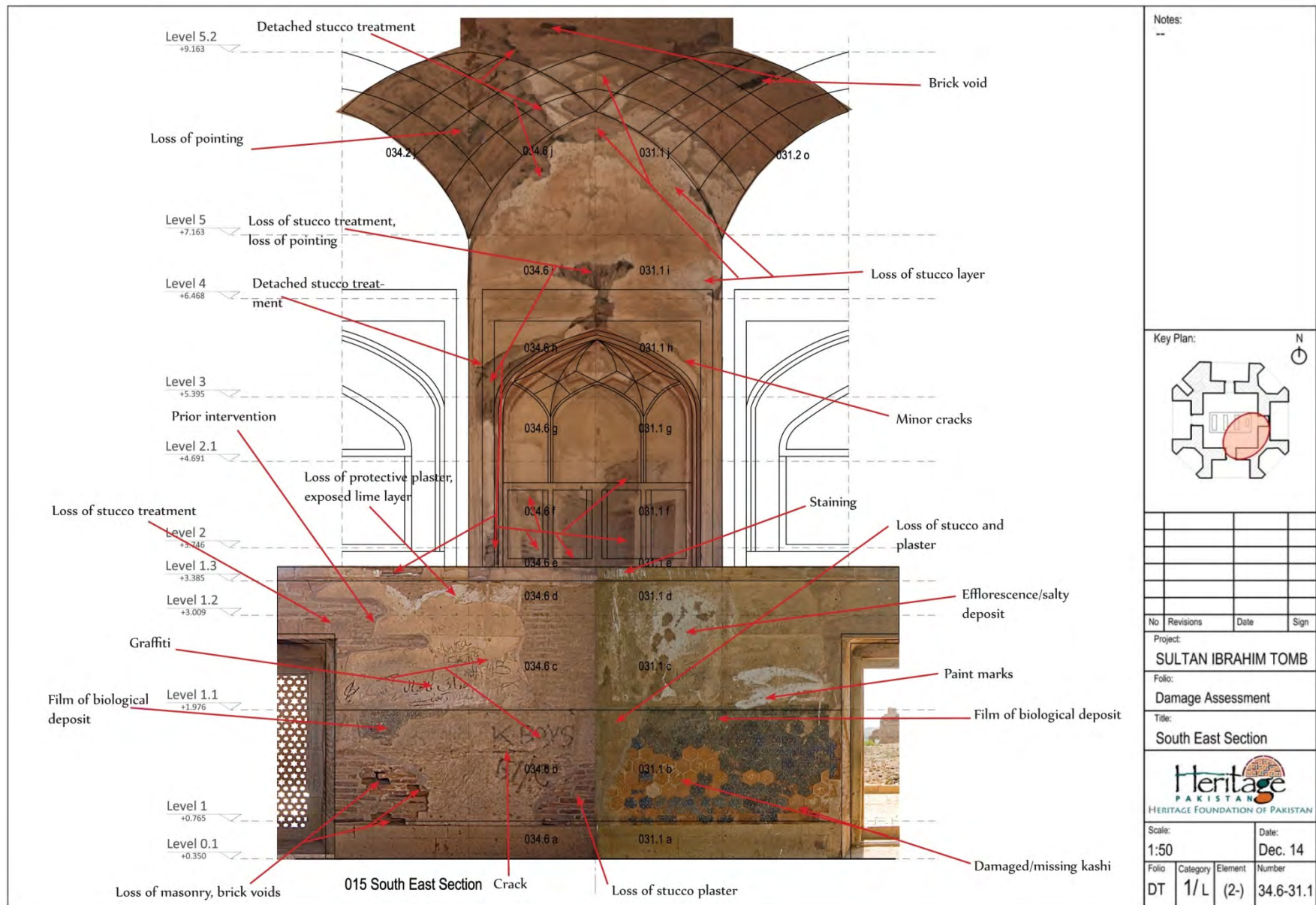




# SOUTH WEST ELEVATION 31.6&32.1 – TOMB OF SULTAN IBRAHIM

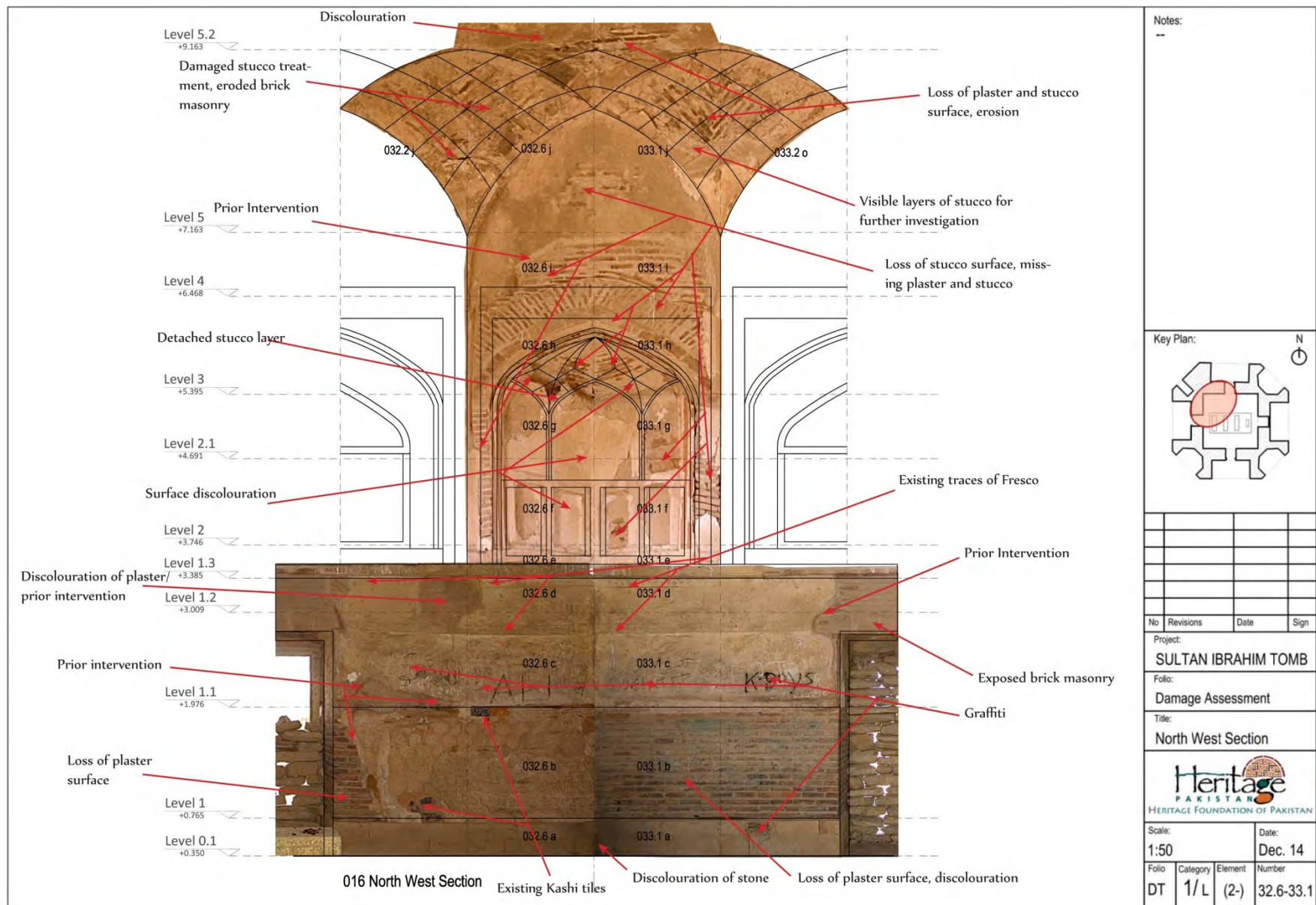


# SOUTH EAST ELEVATION 31.1& 33.6 – TOMB OF SULTAN IBRAHIM



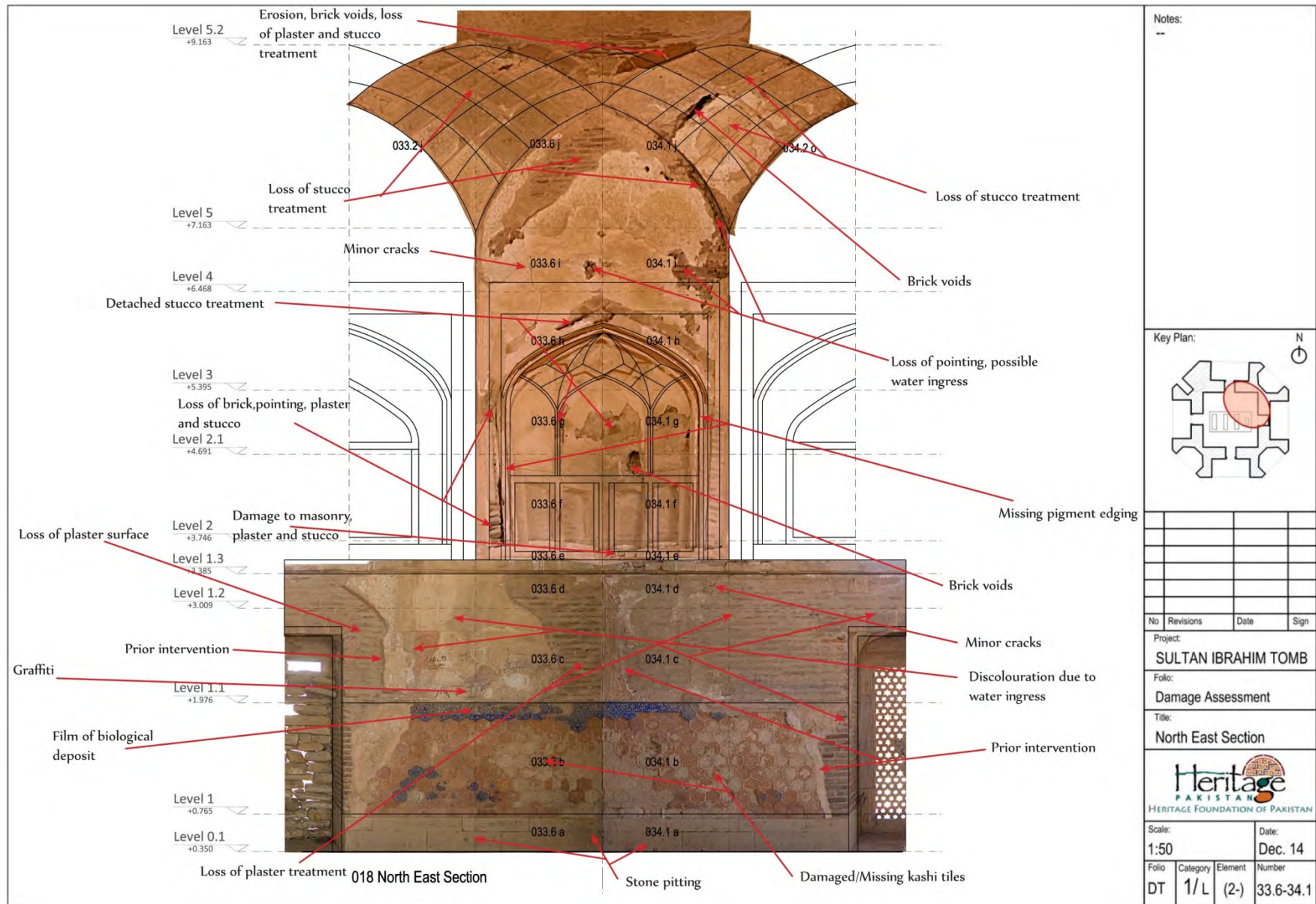


# NORTH WEST ELEVATION 32.6&33.1 – TOMB OF SULTAN IBRAHIM

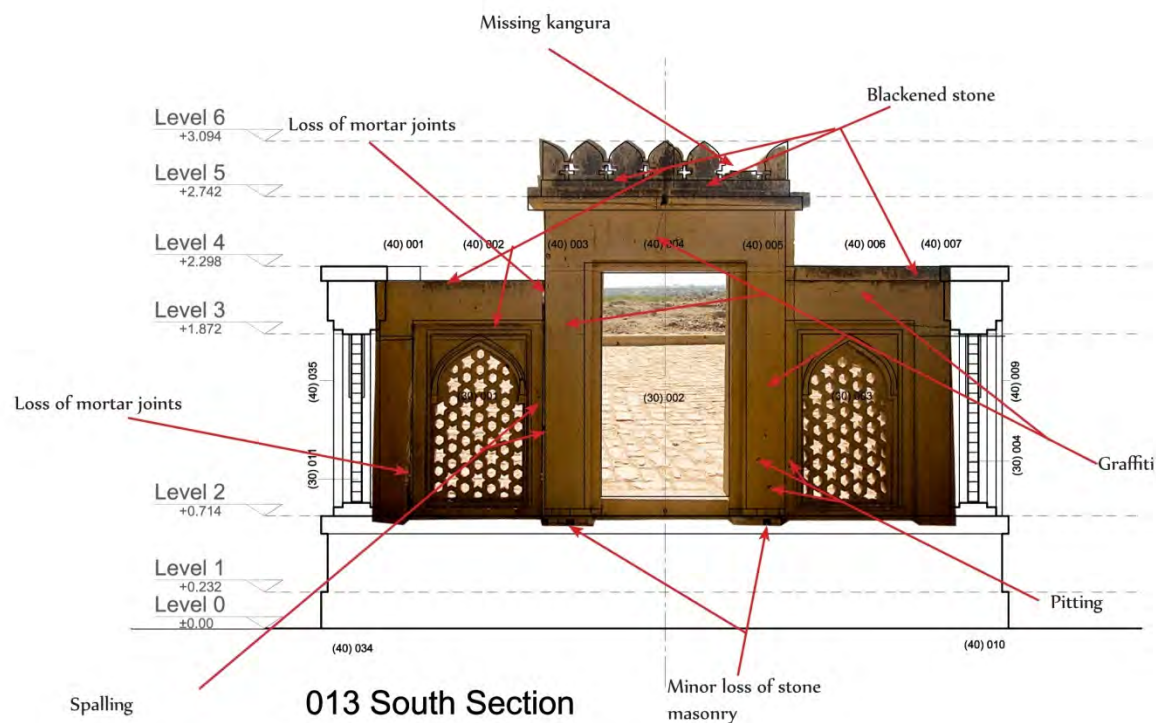




# NORTH EAST ELEVATION 33.6&34.1 – TOMB OF SULTAN IBRAHIM



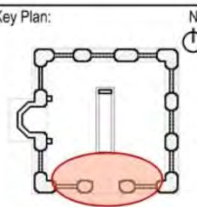
## SOUTH ELEVATION 013- TOMB OF AMIR SULTAN



Notes:
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Key Plan:



No	Revisions	Date	Signature

Project:

AMIR SULTAN TOMB

Folio:

## Damage Assessment

Title:

013 South Section



Scale:

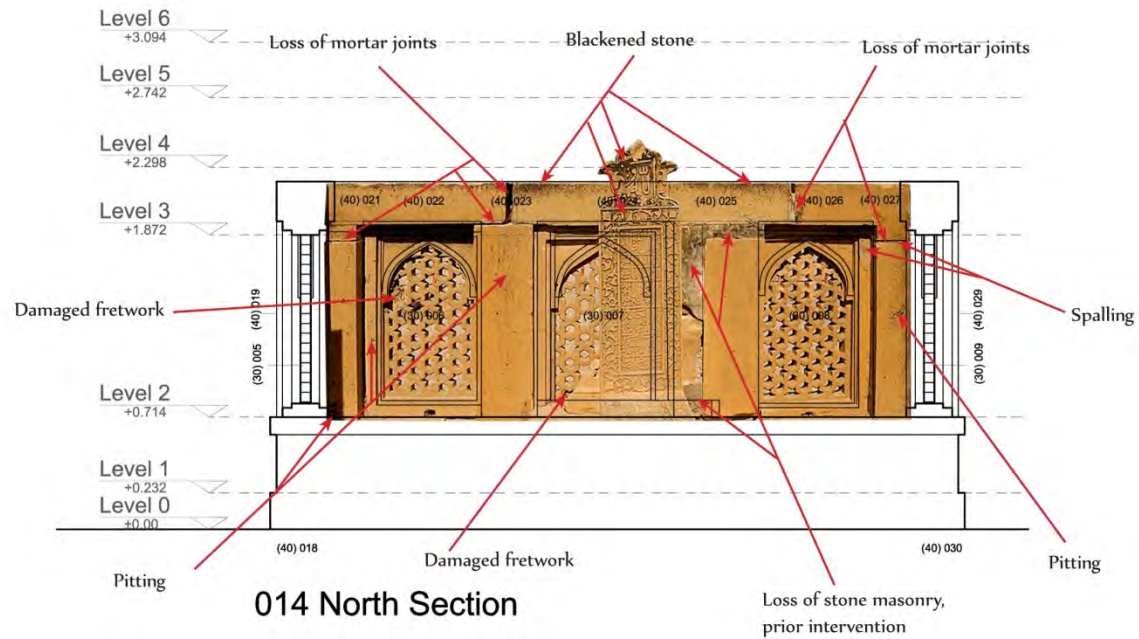
1:50

Date:

Dec. 14

Folio	Category	Element	Numero
DT	2/ L	(2-)	013

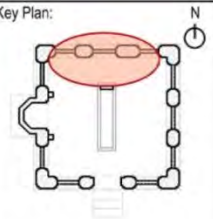
# NORTH ELEVATION 014– TOMB OF AMIR SULTAN



Notes:

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Key Plan:



No	Revisions	Date	Sign

Project:

AMIR SULTAN TOMB

Folio:

Damage Assessment

Title:

014 North Section

**Heritage**  
PAKISTAN  
HERITAGE FOUNDATION OF PAKISTAN

Scale:

1:50

Date:

Dec. 14

Folio

DT

Category

2/ L

Element

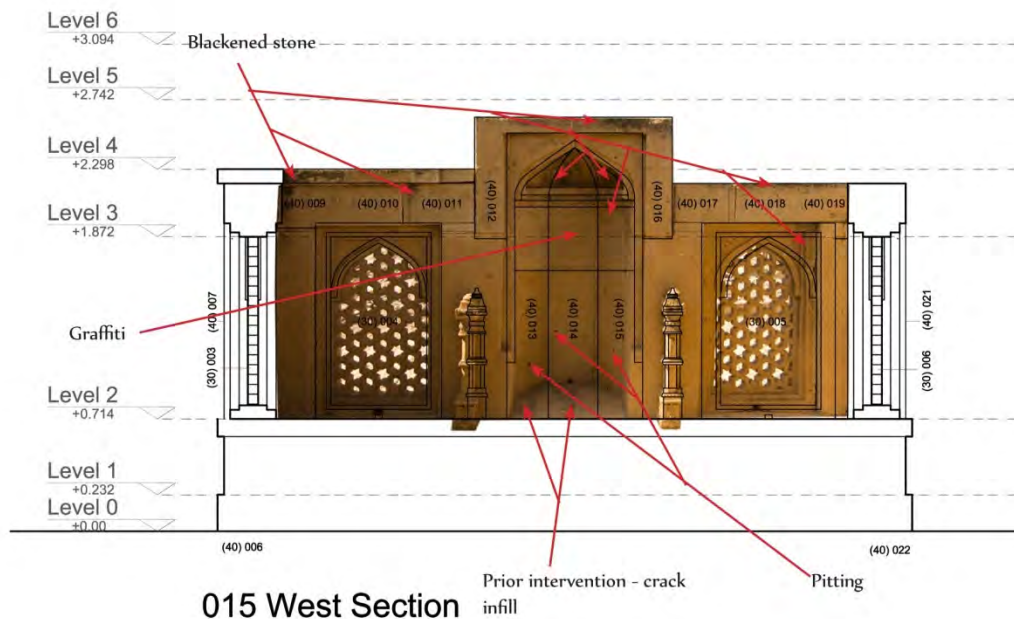
(2-)

Number

014



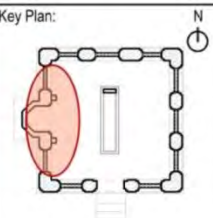
## WEST ELEVATION 015- TOMB OF AMIR SULTAN



Notes:
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Key Plan:




No	Revisions	Date	Sign
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Project:

AMIR SULTAN TOMB

Folio:

### Damage Assessment

Title:

015 West Section



Scale:

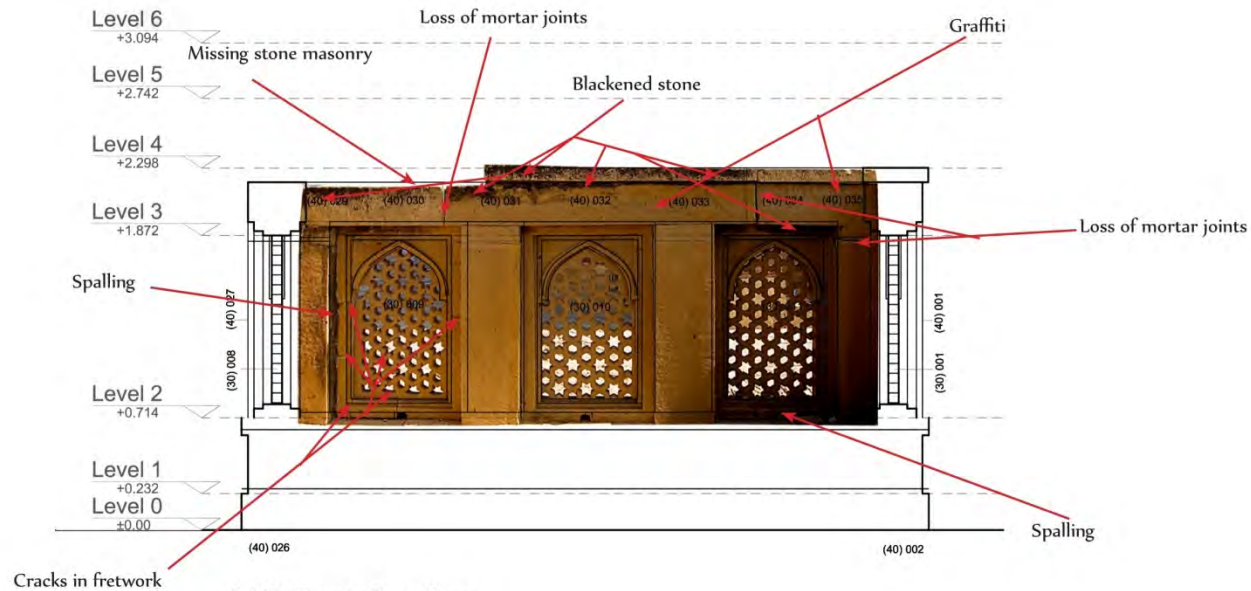
1:50

Date:

Dec. 14

Folio	Category	Element	Number
DT	2/ L	(2-)	015

# EAST ELEVATION 016– TOMB OF AMIR SULTAN

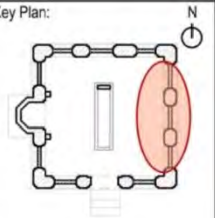


016 East Section

Notes:

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Key Plan:




No	Revisions	Date	Sign
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Project:

AMIR SULTAN TOMB

Folio:

Damage Assessment

Title:

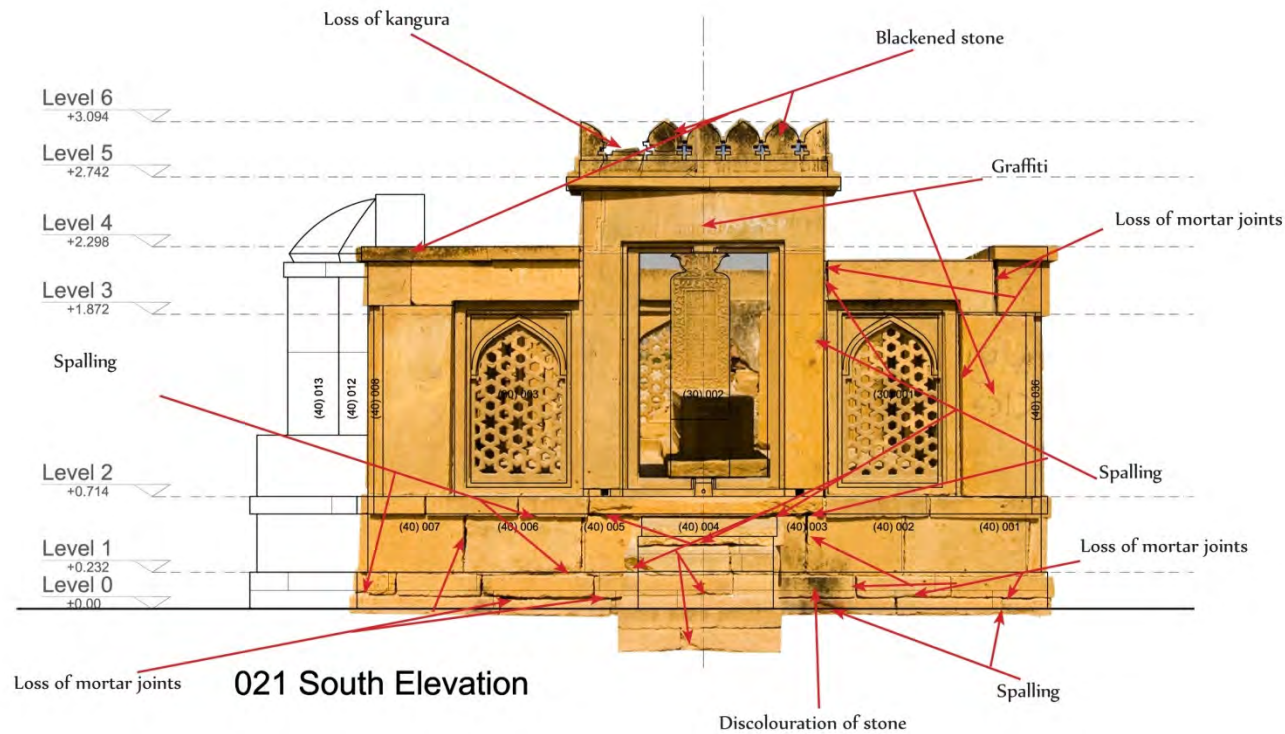
016 East Section



Scale:	Date:
1:50	Dec. 14

Folio	Category	Element	Number
DT	2/L	(2-)	016

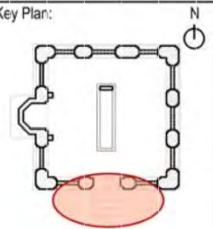
# SOUTH ELEVATION 021– TOMB OF AMIR SULTAN



Notes:

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Key Plan:



No	Revisions	Date	Sign

Project:  
AMIR SULTAN TOMB

Folio:  
Damage Assessment

Title:  
021 South Elevation

Heritage  
PAKISTAN  
HERITAGE FOUNDATION OF PAKISTAN

Scale:  
1:50

Date:  
Dec. 14

Folio	Category	Element	Number
DT	2/L	(2-)	021

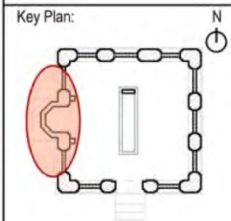


# WEST ELEVATION 022– TOMB OF AMIR SULTAN

Notes:

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Key Plan:



No	Revisions	Date	Sign

Project:  
AMIR SULTAN TOMB

Folio:  
Damage Assessment

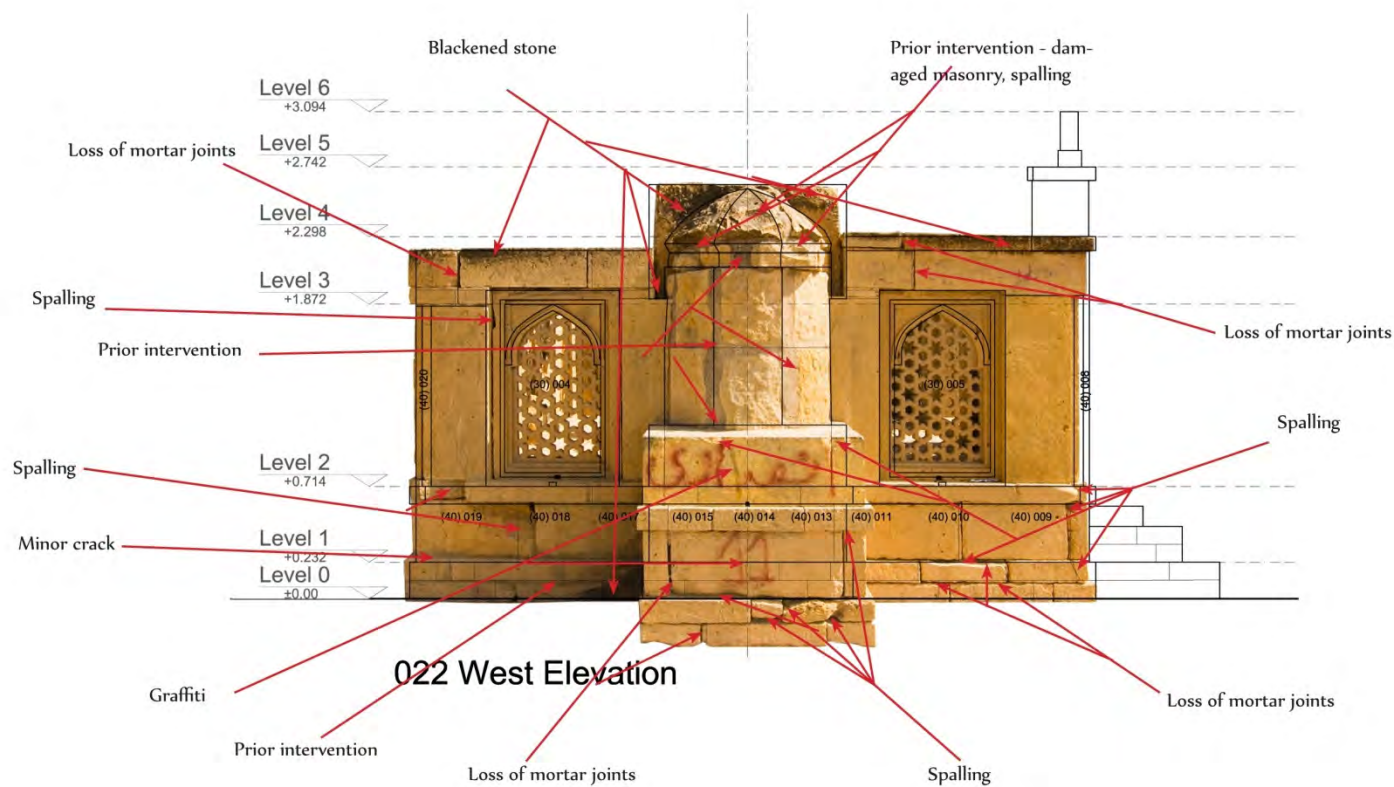
Title:  
022 West Elevation

**Heritage**  
PAKISTAN  
HERITAGE FOUNDATION OF PAKISTAN

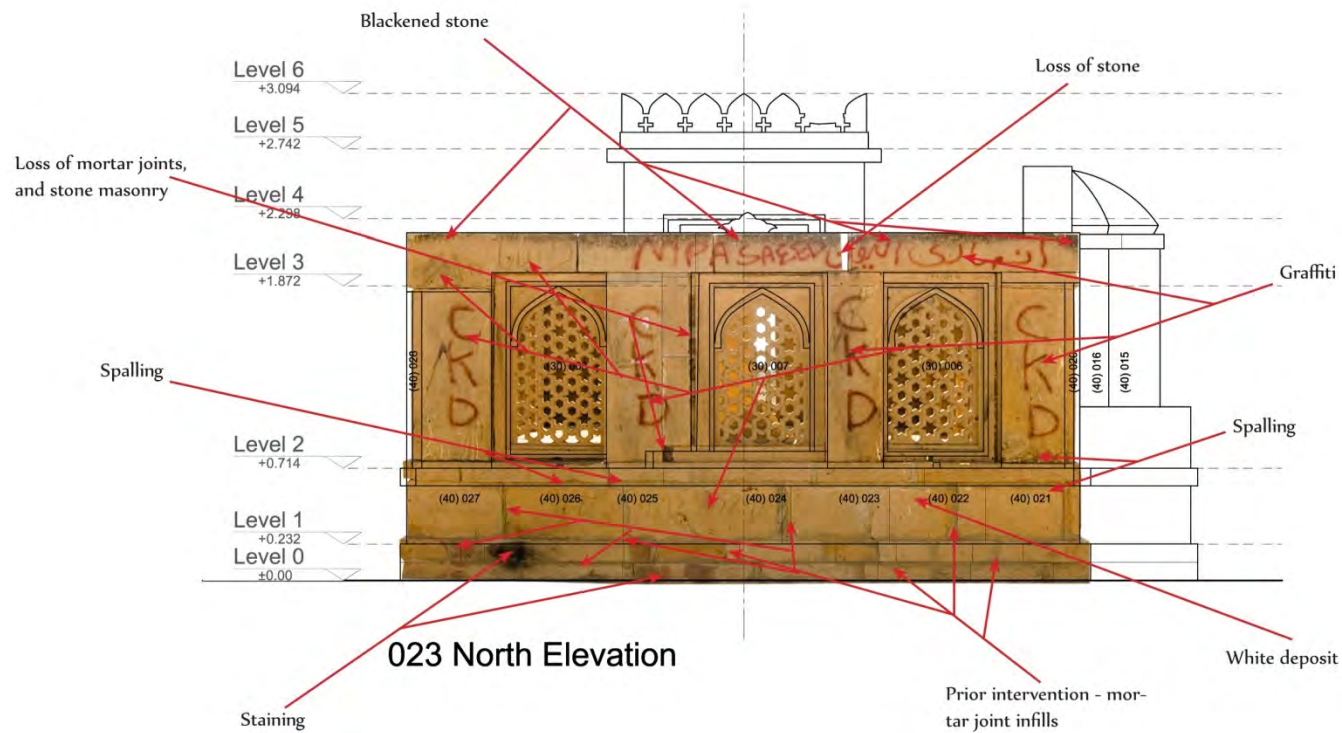
Scale:  
1:50

Date:  
Dec. 14

Folio	Category	Element	Number
DT	2/L	(2-)	022



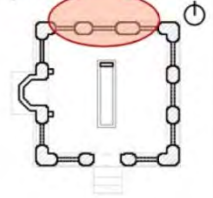
# NORTH ELEVATION 023– TOMB OF AMIR SULTAN



Notes:

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Key Plan:



No	Revisions	Date	Sign

Project:  
AMIR SULTAN TOMB

Folio:  
Damage Assessment

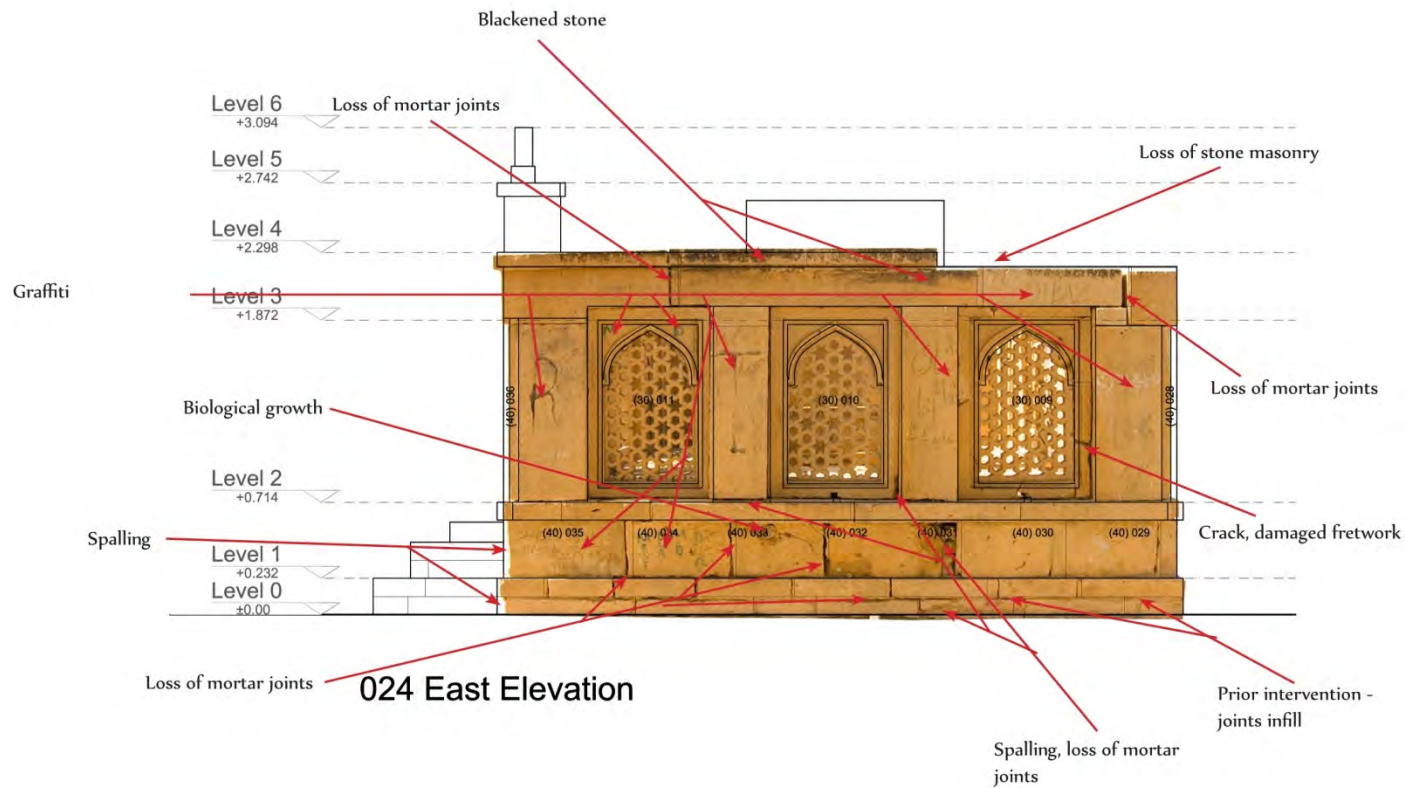
Title:  
023 North Elevation

**Heritage**  
PAKISTAN  
HERITAGE FOUNDATION OF PAKISTAN

Scale: 1:50	Date: Dec. 14
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Folio	Category	Element	Number
DT	2/L	(2-)	023

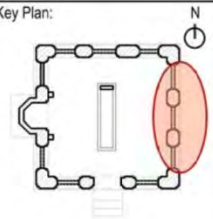
# EAST ELEVATION 024 – TOMB OF AMIR SULTAN



Notes:

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Key Plan:



No	Revisions	Date	Sign

Project:

AMIR SULTAN TOMB

Folio:

Damage Assessment

Title:

024 East Elevation



Scale:

1:50

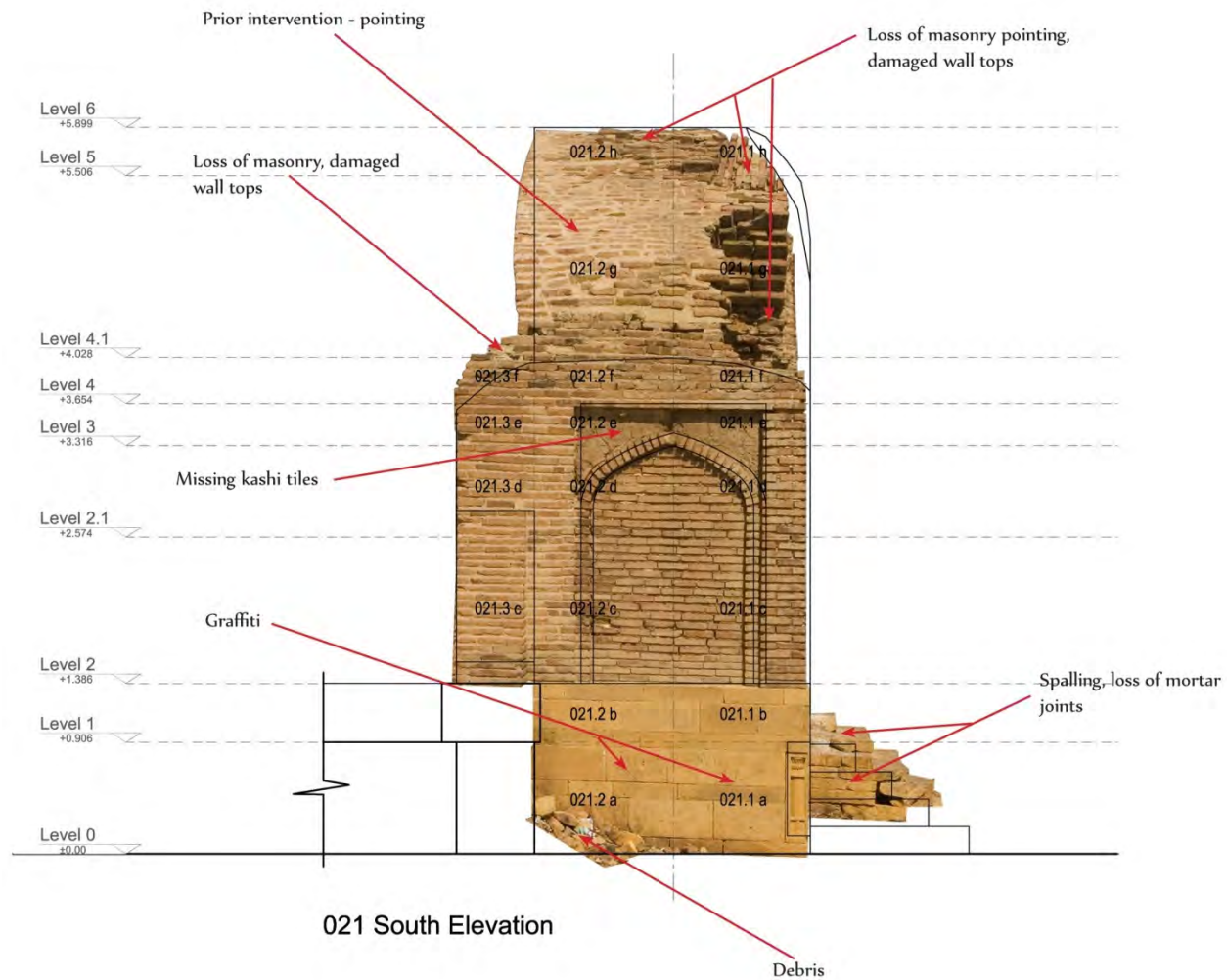
Date:

Dec. 14

Folio	Category	Element	Number
DT	2/ L	(2-)	024



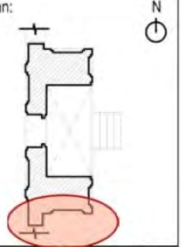
# SOUTH ELEVATION 021- ARCHWAY



Notes:

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Key Plan:



No	Revisions	Date	Sign

Project:  
SULTAN IBRAHIM ARCHWAY

Folio:  
Damage Assessment

Title:  
021 South Elevation

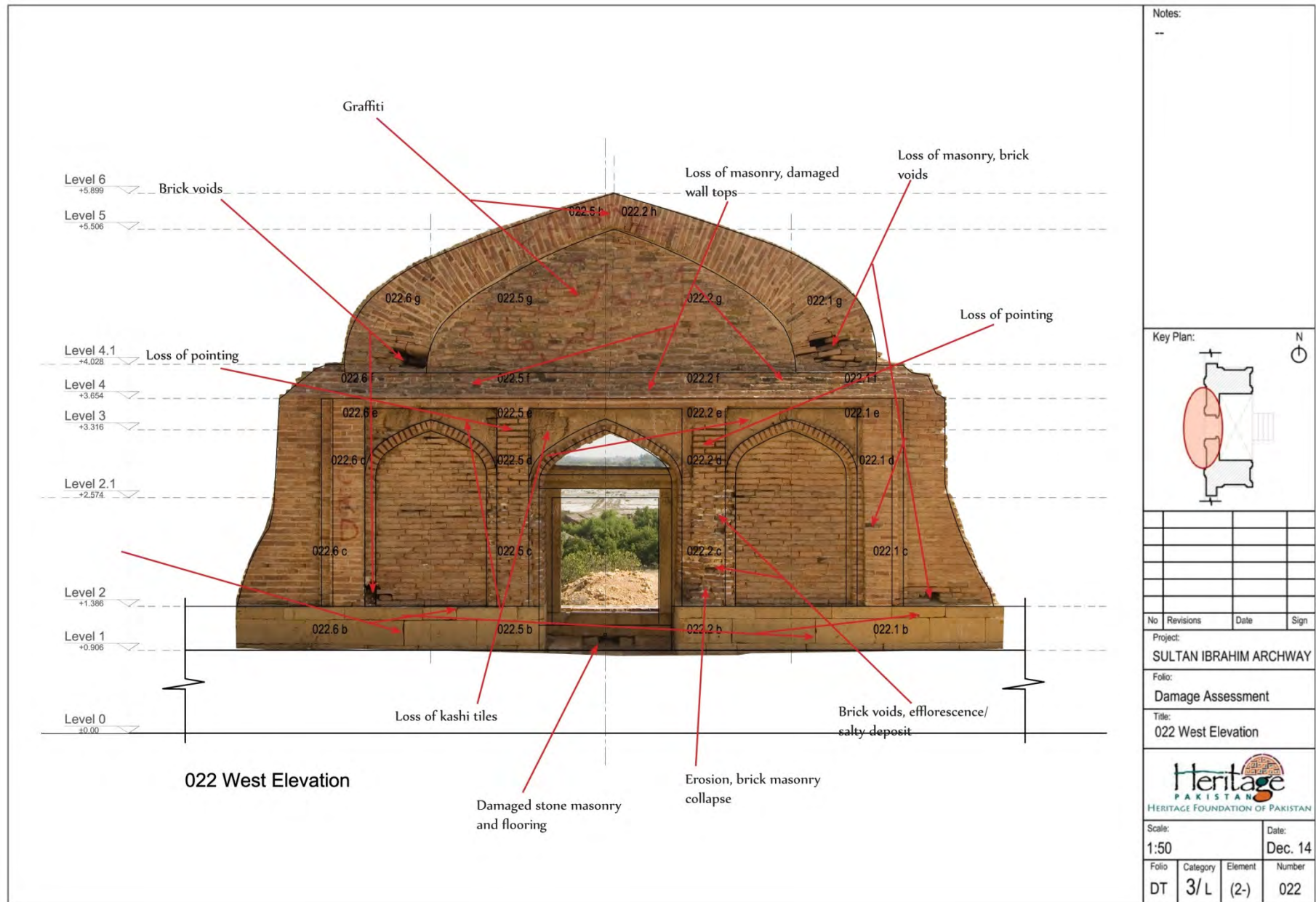
**Heritage**  
PAKISTAN  
HERITAGE FOUNDATION OF PAKISTAN

Scale:  
1:50

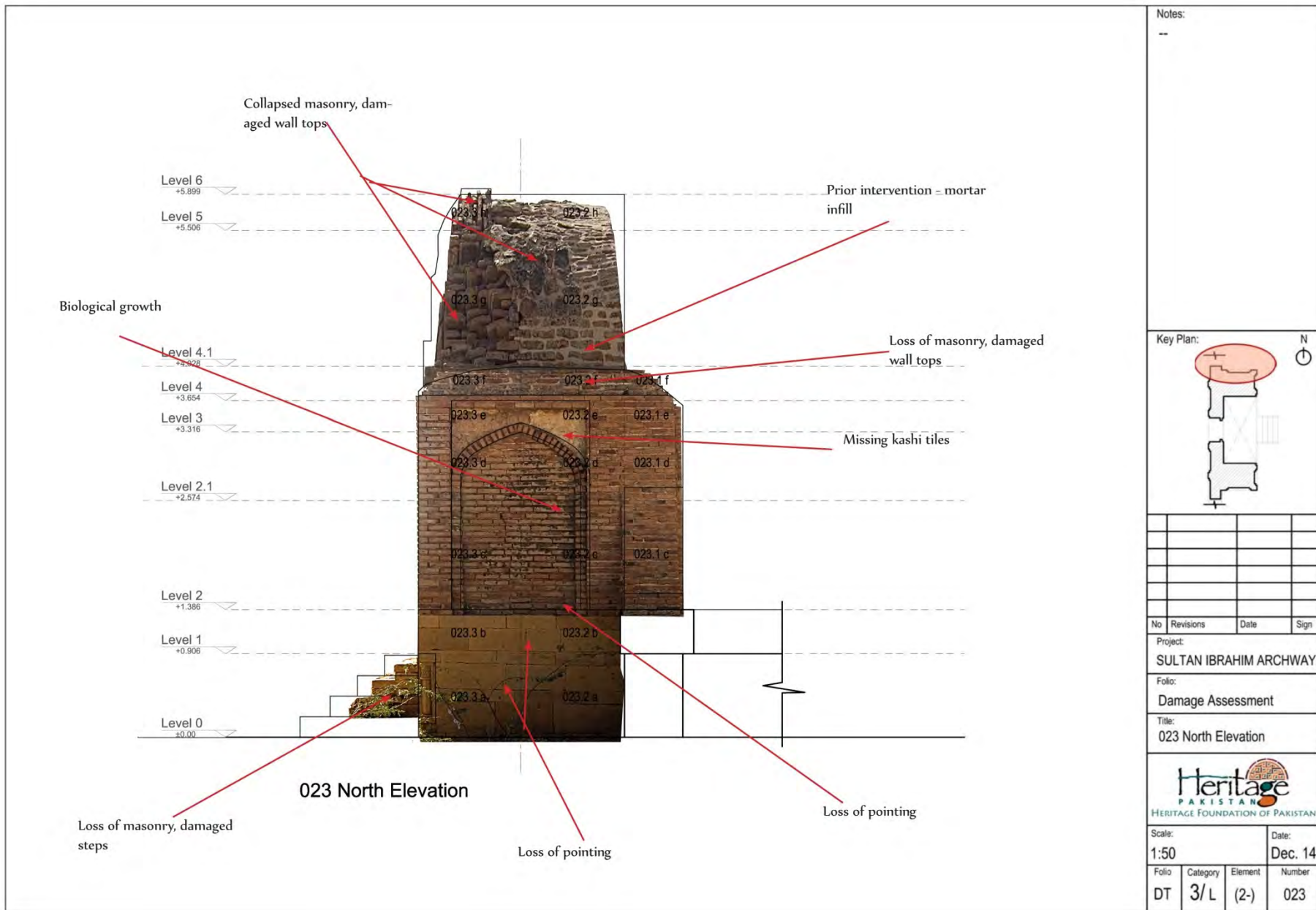
Date:  
Dec. 14

Folio	Category	Element	Number
DT	3/ L	(2-)	021

# WEST ELEVATION 022– ARCHWAY



# NORTH ELEVATION 023- ARCHWAY





# EAST ELEVATION 024– ARCHWAY

