Seismic Retrofitting Project: Assessment of Prototype Buildings

Volume 2

Research Report

Claudia Cancino, Sara Lardinois, Dina D'Ayala, Carina Fonseca Ferreira, Daniel Torrealva Dávila, Erika Vicente Meléndez, and Luis Villacorta Santamato

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The Getty Conservation Institute

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The Getty Conservation Institute works to advance conservation practice in the visual arts, broadly interpreted to include objects, collections, architecture, and sites. It serves the conservation community through scientific research, education and training, model field projects, and the broad dissemination of the results of both its own work and the work of others in the field. And in all its endeavors, it focuses on the creation and dissemination of knowledge that will benefit professionals and organizations responsible for the conservation of the world's cultural heritage.

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Survey Form Example

Earthen Architecture Initiative

Structural Assessment Survey Form – Seismic Retrofitting Project (SRP)

Universidad Católica Sedes Sapientiae · Pontificia Universidad Católica del Perú · University of Bath · The Getty Conservation Institute

Building: Cathedral of Ica

Address: Calle Cajamarca (Libertad) esquina con Calle Bolívar, Ica
Original construction date: _____ Period: _____ ☐ NA
Date of survey: / /
Surveyor: ☐AF / ☐SL / ☐CC / ☐LV / ☐DT / ☐EV / ☐DDA / ☐VN / ☐CF

General data

Building type :
Please consider the primary material only. Later sections will require you describing additional materials.

- ☐ Casona:
  - ☐ Adobe one story
  - ☐ Adobe two stories
  - ☐ Adobe and quincha, two or more stories
- ☐ Church:
  - ☐ Adobe walls, quincha vault/dome roofing system
  - ☐ Adobe walls, wooden truss roofing system

Context:

- ☐ Within:
  - ☐ Historic district/center
  - ☐ Urban environment
  - ☐ Country side
- ☐ Adjacent to other buildings (wall to wall):
  - i. If yes, indicated in the floor plan
  - ii. Define building location within the block:
    - ☐ End of the block
    - ☐ Corner
    - ☐ Middle
- ☐ Close to other buildings: Distance:_____
- ☐ Isolated

Setting:
☐ Flat
☐ Slope

Occupancy:
☐ Unoccupied
☐ Occupied: # @ day: _____
@ night: _____

Shape in plan:
☐ Rectangular ☐ Square
☐ "C" ☐ "L"
☐ Other/Mixed

Wall density:
Wall density for whole building = wall volume in the x or y-direction/total wall volume/plan volume

X-direction; Corresponding street: _____

< 0.5% ☐ 0.5-1.0% ☐1.0-1.5% ☐ 1.5-2.0%% ☐2.0-2.5% ☐ 2.5-3.0%% ☐3.0-3.5% ☐ 3.5-5.0% ☐ 5.0%

Y-direction; Corresponding street: _____

☐ < 0.5% ☐ 0.5-1.0% ☐1.0-1.5% ☐ 1.5-2.0%% ☐2.0-2.5% ☐ 2.5-3.0%% ☐3.0-3.5% ☐ 3.5-5.0% ☐ 5.0%

Use:

- ☐ Housing/Residence:
  - ☐ 1st floor ☐ 2nd floor _____%
  - ☐ One housing unit (HU)
  - ☐ Several housing units (HUs):
  - # of HUs: _____
  - # of rooms per HU: _____
  - # of bathrooms HU: _____
- ☐ Commerce: ☐ 1st floor ☐ 2nd floor ____%
- ☐ Museum: ☐ 1st floor ☐ 2nd floor ____%
- ☐ Religious: ☐ 1st floor ☐ 2nd floor ____%
- ☐ Office: ☐ 1st floor ☐ 2nd floor ____%
- ☐ Other: _____
  ☐ 1st floor ☐ 2nd floor ____%

Social-economic characteristics:

Economic level of inhabitants:
☐ Very poor
☐ Poor
☐ Middle class
☐ Wealthy
☐ NA

Ownership:
☐ Rent:
  ☐ Short term
  ☐ Long term
☐ Own by institution:
  ☐ State ☐ Church
  ☐ Community ☐ Own by individual

Description:

General description:

_____

_____

_____

_____

_____

_____

_____

_____

History of alterations: Please listed attached documents to the current survey for:

1. _____
2. _____
3. _____
4. _____
5. _____

Soil configuration/type: _____

If data is provided of soil analysis and identification, indicate as reference:

_____

_____

_____

_____

Maintenance:

a. Existence of maintenance plan, if yes, by who and how regular:

_____

_____

b. Reports of previous earthquake damage:

☐ Yes
Describe:

_____

_____

☐ No/ Non existent
☐ NA / Not found

Quality of original workmanship:

Base on visual inspection, the quality of original workmanship in the following elements is considered:

Roof:
Where the arches or roof structure properly constructed?

- ☐ Yes
- ☐ No, describe:

_____

_____

- ☐ NA / Non existent

Ceiling:
Where the beams and joists properly constructed?

- ☐ Yes
- ☐ No, describe:

_____

_____

- ☐ NA / Non existent

Masonry:
Where the fabric of the original masonry walls (adobe, quincha, tapial, etc.) properly laid out?

- ☐ Yes (when the staggering in half the length of the adobe)
- ☐ No, describe:

_____

_____

- ☐ NA / Non existent

Foundations:
Where the fabric of the foundations (*Cimentación, Sobrecimiento*) properly laid out?

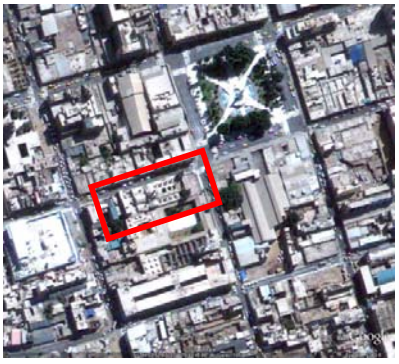
- ☐ Yes (when the stone are regular and regularly staggered)
- ☐ No, describe:

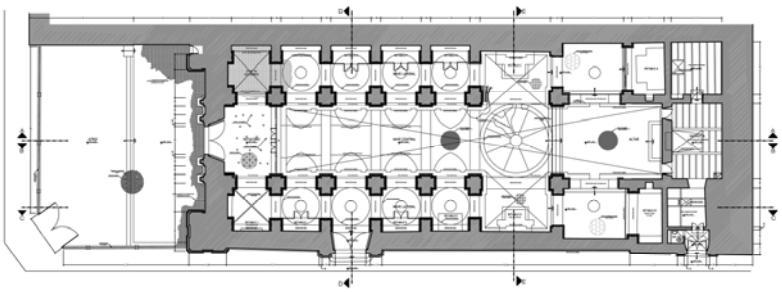
_____

_____

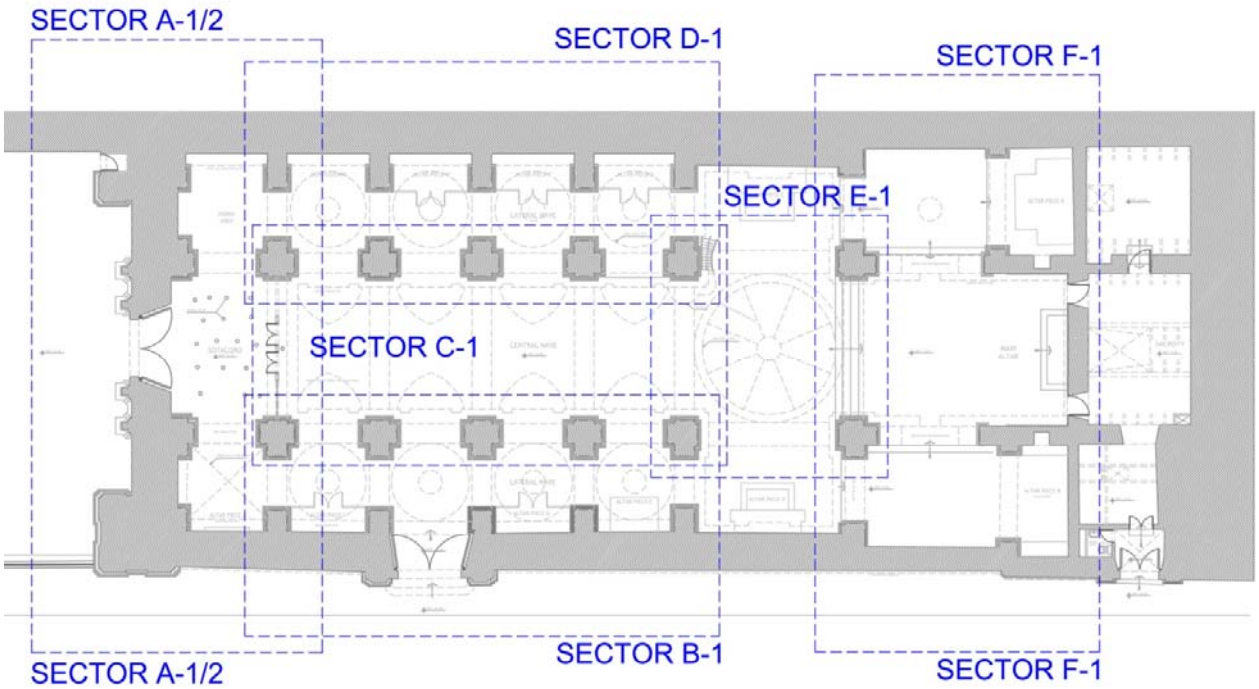
- ☐ NA / Non existent

Satellite image and/or footprint:





Sectors:



Criteria for sectors selection:

The survey team pre-divided the building in 6 different sectors, 6 sectors (A, B, C, D, E & F) on the first floor and 1 sector (A-2) over the *"Sotocoro"*, plus the final roof. The sectors were divided according to the following criteria:

1. Potential structural behavior during an earthquake.
2. Structural and architectural composition.
3. Construction materials and techniques.
4. Time of construction.
5. Additions and/or interventions.

Earthen Architecture Initiative

Structural Assessment Survey Form – Seismic Retrofitting Project in Peru (SRP)

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Building: Cathedral of Ica

Address:

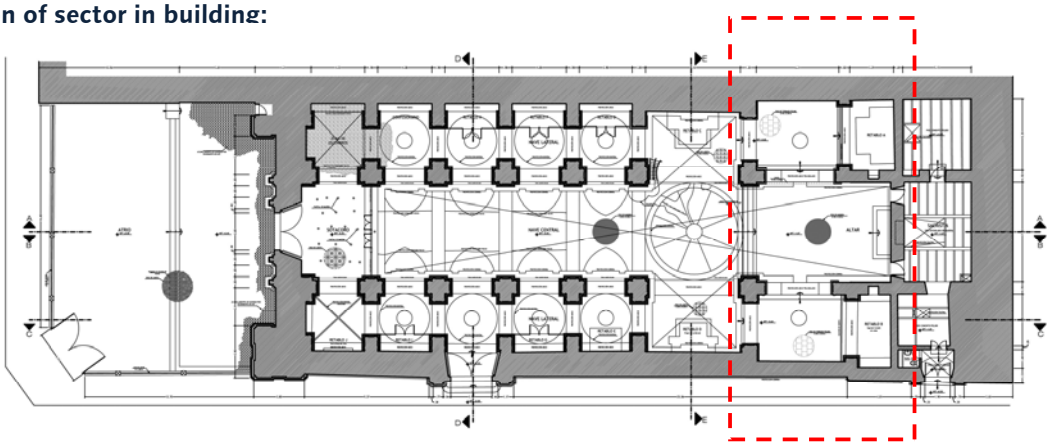
Sector: _____

Sector type :

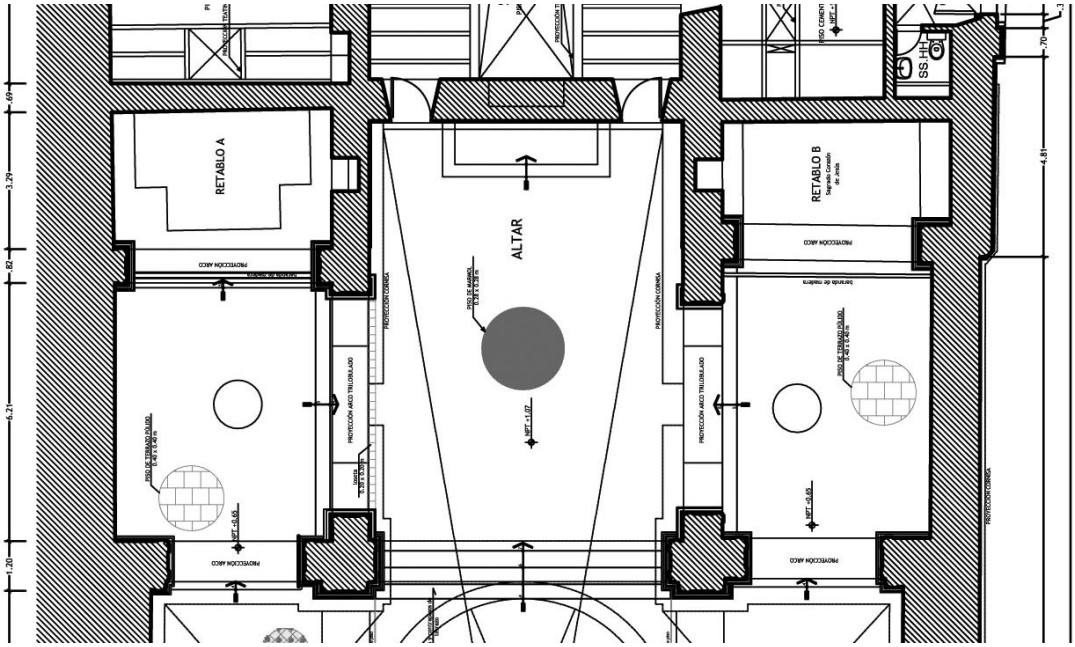
☐ Courtyard / ☐ Tower / ☐ Group of rooms / ☐ Individual Room / ☐ Roof

Level: ☐ First floor / ☐ Second floor / ☐ Third floor

I. Location of sector in building:



II. Floor plan of sector:



III.Sector cross sections, elevations or photos:

IV. General seismic performance and vulnerability

Shape of the building sector: ☐ Rectangular, ☐ Square, ☐ "C", ☐ "L", ☐ Other/Mixed	Average span between walls: _____ X-Direction: _____ Y-Direction: _____

Wall density:
Wall density per sector = wall area in the x or y-direction/total area of the sector

X-direction	**Y-direction**
Corresponding street: _____	**Corresponding street:** _____
☐ < 0.5% ☐ 0.5-1.0% ☐ 1.0-1.5% ☐ 1.5-2.0% ☐ 2.0-2.5% ☐ 2.5-3.0% ☐ 3.0-3.5% ☐ 3.5-5.0% ☐ >5.0%	☐ < 0.5% ☐ 0.5-1.0% ☐ 1.0-1.5% ☐ 1.5-2.0% ☐ 2.0-2.5% ☐ 2.5-3.0% ☐ 3.0-3.5% ☐ 3.5-5.0% ☐ >5.0%
Vertical load-bearing walls seem to be attached to the foundation (first floor only): ☐ Yes ☐ No ☐ NA	Vertical load-bearing walls seem to be attached to the floors/roof structures (others and last floor): ☐ Yes ☐ No ☐ NA

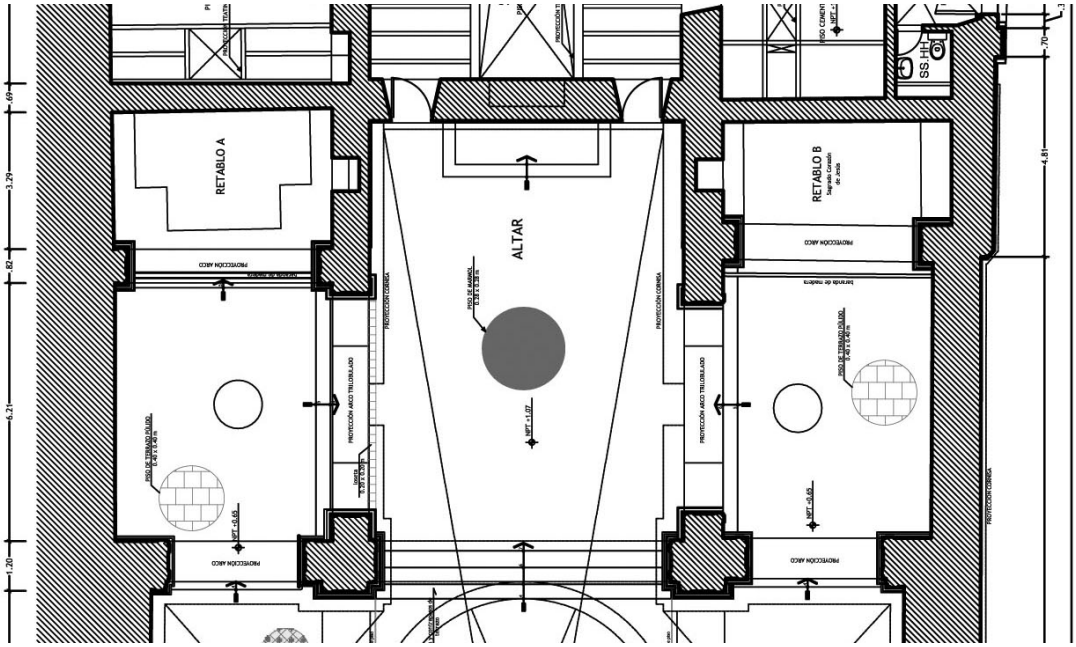
1. Maintenance:
   a. General condition of building sector materials is considered to be adequate:
      ☐ Yes
      ☐ No
      ☐ NA
      ☐ Describe:

      _____
      _____
      _____
      _____

   b. Lack of repair of sector building elements damaged by previous earthquakes:
      ☐ Yes
      ☐ No
      ☐ NA
      ☐ Describe:

      _____
      _____
      _____
      _____

V. Indicate location of photographs of conditions taken (Section VII):

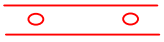


VI. Description of structural system sector: _____

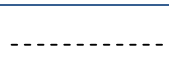
Type				
Foundations				
Cimentación	**Sub-type**	**Details**	**% of sub-type per sector**	**Condition**
☐ Mark here if system is assumed only	☐ Natural	☐ Solid Rock ☐ Stiff soil ☐ Structure rock	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	☐ Cohesive ☐ Non-cohesive
☐ Mark here if system is assumed only	☐ Mad made: Stone "*cimentación*" with mud/lime mortar	☐ Rubble stone High:	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	☐ Cohesive ☐ Non-cohesive
		☐ Stone masonry High:	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	☐ Cohesive ☐ Non-cohesive
Sobrecimiento	**Sub-type**	**Details**	**% of sub-type per facade**	**Condition**
☐ Mark here if system is assumed only	☐ *"Sobrecimiento"* with mud/lime mortar	☐ Rubble stone High:	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	☐ Cohesive ☐ Non-cohesive
		☐ Stone masonry High:	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	☐ Cohesive ☐ Non-cohesive
Others	**Sub-type**		**% of sub-type per facade**	**Condition**
	Walls sitting on natural unmodified ground		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	

Load bearing masonry/quincha walls
(Skip if roof sector) Identify locations of wall materials on plan

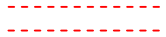
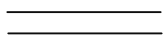
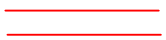
	Sub-type	**Details**	**Approx. # of walls of sub-type/total # of walls**	**Graphic at plan**
☐ Mark here if system is assumed only	☐ Adobe masonry walls: Dimensions: Mortar:	☐ With mud mortar (probably original)	☐ 1 = All walls ☐ 1/2 of walls ☐ 3/4 of walls ☐1/4 of walls	
		☐ With mud mortar and insertions of bricks with cement mortar	☐ 1 = All walls ☐ 1/2 of walls ☐ 3/4 of walls ☐1/4 of walls	
	☐ Rammed earth walls		☐ 1 = All walls ☐ 1/2 of walls ☐ 3/4 of walls ☐1/4 of walls	
	☐ Brick masonry walls	☐ With cement mortar ☐ With lime mortar	☐ 1 = All walls ☐ 1/2 of walls ☐ 3/4 of walls ☐1/4 of walls	
	☐ Stone masonry walls	☐ With mud mortar	☐ 1 = All walls ☐ 1/2 of walls ☐ 3/4 of walls ☐1/4 of walls	
		☐ With lime/cement mortar	☐ 1 = All walls ☐ 1/2 of walls ☐ 3/4 of walls ☐1/4 of walls	

☐ Quincha walls with wooden frames	☐ With cane reed (part of original construction)	☐ 1 = All walls ☐ 1/2 of walls ☐ 3/4 of walls ☐ 1/4 of walls	
	☐ With adobe blocks infill	☐ 1 = All walls ☐ 1/2 of walls ☐ 3/4 of walls ☐ 1/4 of walls	
	☐ With brick infill	☐ 1 = All walls ☐ 1/2 of walls ☐ 3/4 of walls ☐ 1/4 of walls	

Previous structural reinforcements
Identify locations of wall materials on plan

Sub-type	Details	Approx. # of walls of sub-type/total # of walls	Graphic at plan
☐ Reinforced masonry walls	☐ Brick with embedded concrete columns	☐ 1 = All walls ☐ 1/2 of walls ☐ 3/4 of walls ☐ 1/4 of walls	
	☐ Adobe blocks with embedded concrete columns	☐ 1 = All walls ☐ 1/2 of walls ☐ 3/4 of walls ☐ 1/4 of walls	
☐ Concrete frame with unreinforced masonry walls	☐ Brick	☐ 1 = All walls ☐ 1/2 of walls ☐ 3/4 of walls ☐ 1/4 of walls	
	☐ Adobe	☐ 1 = All walls ☐ 1/2 of walls ☐ 3/4 of walls ☐ 1/4 of walls	
☐ Reinforcements		**Location**	**Graphic at plan**
	☐ Iron/Steel bars	☐ Across walls ☐ Inside walls	
	☐ Anchors	☐ Top to roof ☐ Wall to wall	
	☐ Wooden keys		
	☐ Isolated concrete beams	☐ Longer walls ☐ Shorter walls ☐ Across the room ☐ Around the room	
	☐ Wooden beams	☐ Longer walls ☐ Shorter walls ☐ Across the room ☐ Around the room	

Plaster
(Could be applicable also for roof sector) Identify locations of plaster types on plan.

	Sub-type	Details	% of sub-type on all walls per sector	Graphic at plan
On walls ☐ Yes ☐ No	☐ Mud/Lime plaster	☐ Painted	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	
		☐ Not-painted	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	
	☐ Cement plaster		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	
	☐ Painted surface only		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	
Roof ☐ Yes ☐ No	☐ Mud/Lime plaster	☐ Painted	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	
		☐ Not-painted	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	
	☐ Cement plaster		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	
	☐ Painted surface only		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	

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Flooring (Skip if roof sector or last floor) **Direction @ longer wall. # and dimensions**	**Sub-type**	**Details**
☐ Parallel; #: _____ Indicate in plan: .... Dimensions: Structural elements:_____ m. Space between them:_____ m.	☐ With wooden beams and rafters	☐ Mud plaster or not + wooden structure + mud cover + wooden floors ☐ Mud plaster or not + wooden structure + cement cover + other type of floor
☐ Perpendicular, #: _____ Indicate in plan: .... Dimensions: Structural elements:_____ m. Space between them:_____ m.	☐ With concrete beams and rafters	☐ Mud plaster or not + wooden structure + mud cover + wooden floors ☐ Mud plaster or not + wooden structure + cement cover + other type of floor

Roofing **Direction @ longer wall. # and dimensions**	**Sub-type**	**Details**
☐ Parallel; #: _____ Indicate in plan: .... Dimensions: Structural elements:_____ m. Space between them:_____ m.	☐ *Par y Nudillo*	☐ Wood rafters, tie beam, collar beam, wall plate, mud plaster, cane, mud cover and straw.
		☐ Wood rafters, tie beam, collar beam, wall plate, mud plaster, cane, mud cover and tiles.
		☐ Wood rafters, tie beam, collar beam, wall plate, cane, mud cover and tiles.
		☐ Wood rafters, tie beam, collar beam, wall plate, cane and tiles.
		☐ Wood rafters, tie beam, collar beam, wall plate, cane, cement cover and tiles.
☐ Perpendicular, #: _____ Indicate in plan: .... Dimensions: Structural elements:_____ m. Space between them:_____ m.	☐ Concrete structure	☐ Flat
		☐ Two eaves
	☐ Quincha vault/dome: Wooden frame, ribs and arches	☐ With cane planks laid across wooden arches and mud mortar
		☐ With cane planks laid across wooden arches and cement mortar
	☐ Flat	☐ With mud plaster, wooden beams and joists, and mud cover.
		☐ With wooden beams and joists, and mud cover
		☐ With mud plaster, wooden beams and joists, and cement cover.
	☐ Other	Describe:

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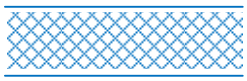
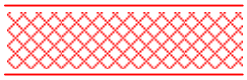
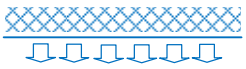
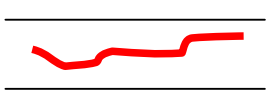
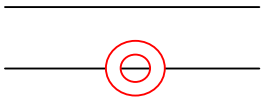
VII. Conditions impacting seismic performance of sector: _____

General impression: ☐ Stable ☐ Instable

Adobe/Quincha walls			
Conditions:	**In relation to the longer wall**	**Location**	**Graphic at plan**
Total wall collapse	☐ Yes ☐ No	☐ All walls ☐ ½ of walls ☐ 3/4 of walls ☐ 1/4 of walls	
Partial wall collapse (no consider plaster)	☐ Yes ☐ No	☐ At the center ☐ At the corners ☐ Upper section	
Settlement of walls:	☐ Yes ☐ No	☐ Center ☐ Edges	
Corner damage: (The "V" thing, incipient corner collapse)	☐ Yes ☐ No	☐ All height ☐ Upper	
Out of plane displacement: ☐ Yes ☐ No	☐ Inward ☐ Outward ☐ Bowing	☐ Lower ☐ Upper ☐ Middle	
Structural cracking: ☐ Yes ☐ No	☐ Horizontal	☐ Lower ☐ Upper ☐ Center	
	☐ Vertical	☐ Lower ☐ Upper ☐ Center ☐ Coming out of openings ☐ At corners	
	☐ Flexural	☐ Wall to wall ☐ Wall to mid-wall	
	☐ Diagonal	☐ Top to bottom ☐ Top to mid-height ☐ Bottom to mid-height	
	☐ X-Shaped	☐ Top to bottom ☐ Top to mid-height ☐ Bottom to mid-height	

Earthen Architecture Initiative

Structural Assessment Survey Form – Seismic Retrofitting Project in Peru (SRP)

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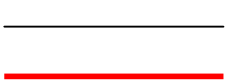
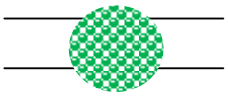
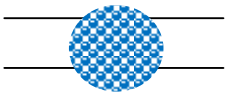
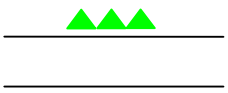
Conditions:	Details	Graphic at plan	% of sub-type on all walls per sector
Plaster loss: ☐ Yes ☐ No	☐ Center ☐ Corners ☐ Lower ☐ Upper		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% of walls show plaster detachment
Detachment of plasters: ☐ Yes ☐ No	☐ Center ☐ Corners ☐ Lower ☐ Upper		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% of walls show plaster loss
Beetle damage (Round isolated holes): ☐ No ☐ Yes With: ☐ Disaggregation	☐ Center ☐ Corners ☐ Lower ☐ Upper		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% of walls show beetle damage
Erosion: ☐ Yes ☐ No	☐ Upper ☐ Center ☐ Lowers ☐ At corners Average depth of loss: ☐ <0.01 ☐ 0.01-0.05 ☐ > 0.05		☐<25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% of the facade show erosion
Moisture damage: ☐ No ☐ Yes With: ☐ Detachment ☐ Blistering ☐ Disaggregation ☐ Erosion ☐ Discoloration ☐ Rising damp ☐ Mold ☐ Vegetation	☐ Center ☐ Corners ☐ Top ☐ Bottom		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% of walls show moisture damage
Presence of vegetation: ☐ Yes ☐ No	☐ Center ☐ Corners ☐ Top ☐ Bottom		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% of walls has vegetation

Earthen Architecture Initiative

Structural Assessment Survey Form – Seismic Retrofitting Project in Peru (SRP)

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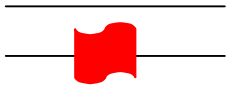
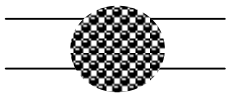
Wooden beams, rafters, quincha frames:

Deformation:
- ☐ No
- ☐ Yes

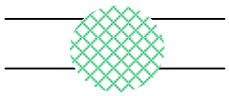


Floors		
☐Joists (“*viguetas*”)	☐ Center ☐ At intersection	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show deformation
☐Beams (“*vigas*”)	☐ Center ☐ At connections	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show deformation
Roof		
☐Rafters (“*pares*”)	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show deformation
☐ Purlins	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show deformation
☐ Ridge purlins (“*Cumbrera*”)	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show deformation
☐ Collar beam (“*Nudillos*”)	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show deformation
☐Arches/Ribs	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show deformation
Quincha frames		
☐Vertical posts ☐Diagonal posts	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show deformation

Rotting:
- ☐ No
- ☐ Yes



Floors		
☐Joists (“*viguetas*”)	☐ Center ☐ At intersection	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show rotting
☐Beams (“*vigas*”)	☐ Center ☐ At connections	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show rotting
Roof		
☐Rafters (“*pares*”)	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show rotting
☐ Purlins	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show rotting
☐ Ridge purlins (“*Cumbrera*”)	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show rotting

	☐ Collar beam ("*Nudillos*")	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show rotting
	☐Arches/Ribs	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show rotting
	Quincha frames		
	☐Vertical posts ☐Diagonal posts	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show rotting
Termite damage: ☐ No ☐ Yes 	Floors		
	☐Joists ("*viguetas*")	☐ Center ☐ At intersection	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show termite damage
	☐Beams ("*vigas*")	☐ Center ☐ At connections	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show termite damage
	Roof		
	☐Rafters ("*pares*")	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show termite damage
	☐ Purlins	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show termite damage
	☐ Ridge purlins ("*Cumbrera*")	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show termite damage
	☐ Collar beam ("*Nudillos*")	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show termite damage
	☐Arches/Ribs	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show termite damage
	Quincha frames		
	☐Vertical posts ☐Diagonal posts	☐ Center ☐ At intersection	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show termite damage
	Adobe masonry - (Usually located at the bottom of the façade)		
	☐ Yes ☐ No	☐ All façade ☐ Corners ☐ Center	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show termite damage
Connections			
Corrosion on metal anchors/nails: ☐ No ☐ Yes 	☐Anchors	☐ Top of walls ☐ Bottom	
	☐Bars	☐ Middle/Center ☐ At the edges	

Failure/Disconnections: ☐ No ☐ Yes 	Wall to wall: ☐Edge connection ☐Internal T connection	☐ All height ☐ Upper ☐ Lower	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show failure
	☐Lintels	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show failure
	☐Floor/Wall connections	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show failure
	☐Roof/Top of the wall connections	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show failure

Earthen Architecture Initiative

Structural Assessment Survey Form – Seismic Retrofitting Project in Peru (SRP)

Universidad Católica Sedes Sapientiae · Pontificia Universidad Católica del Perú · University of Bath · The Getty Conservation Institute

Building: Cathedral of Ica

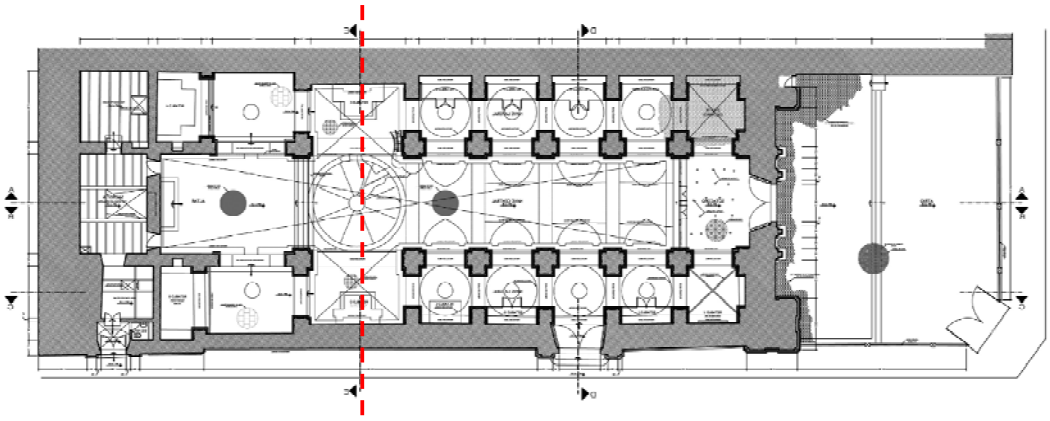
Address:

Facade: _____

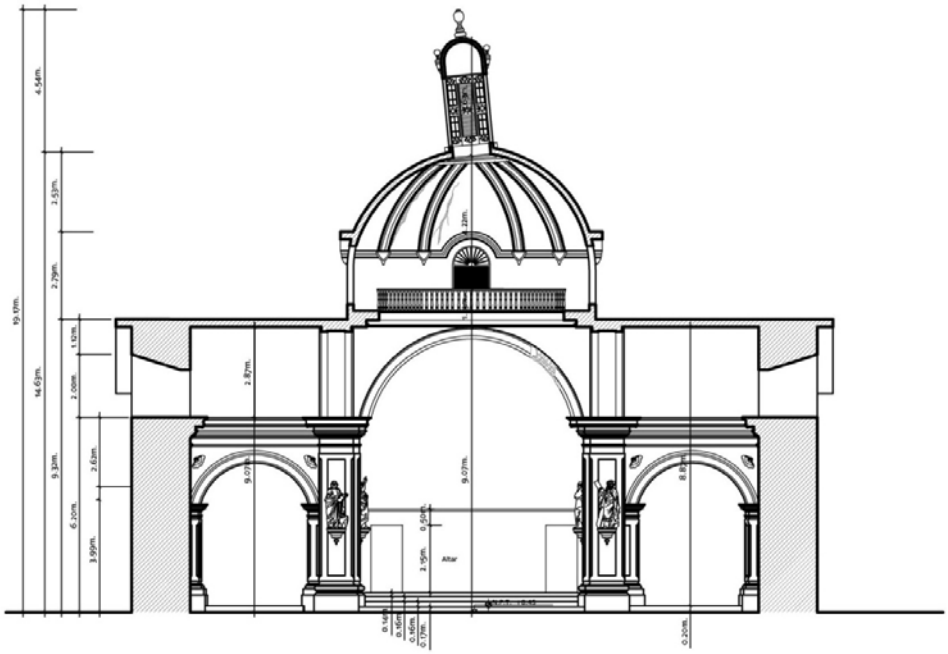
Type: ☐ Exterior / ☐ Interior/Patio/Courtyard

Date of survey: / / (mm/dd/yy)

I. Location of facade (square) or cross section (line) in the building:



II. Elevation of façade or cross section:



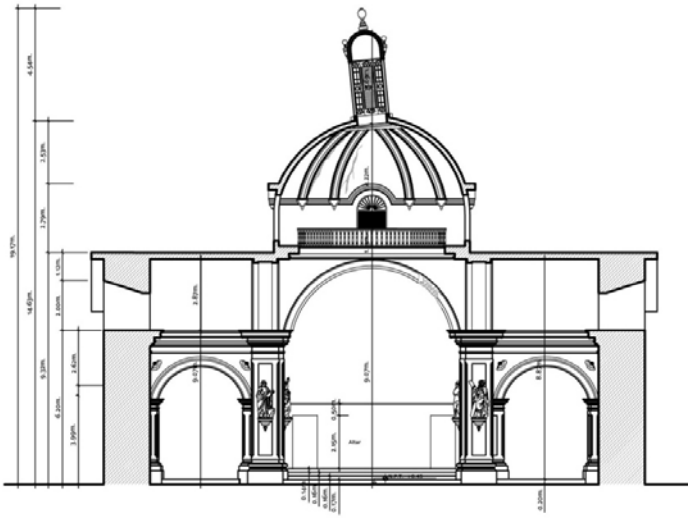
III. Facade photos or sketches:

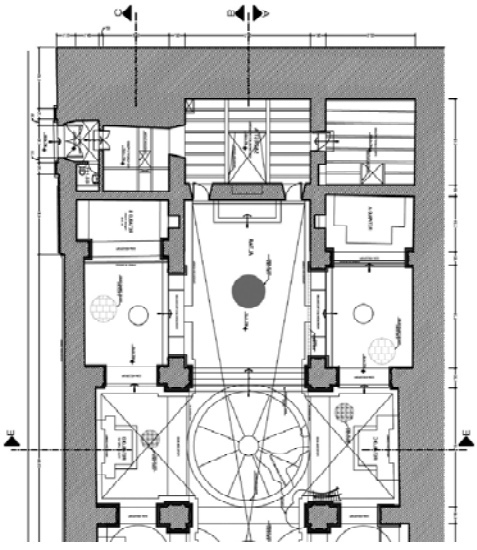
IV. General seismic performance and vulnerability

The total width of door and window openings in a sector wall is less than 1/3 of the distance between the adjacent cross walls: ☐ Yes ☐No ☐NA	Height-to-thickness ratio of the shear walls is: _____
Average story height: _____	Average ratio opening/walls: _____
Façade is restrained at diaphragm level by: ☐ Joists ☐ Rafters: Presence of: ☐ Wall plate ☐ Pins ☐ Inca external anchor ☐ External pin anchor ☐ Embedded pin anchor ☐ Others: _____ ☐ NA	Type of openings: ☐ Floor height #:_____ ☐ Less than floor height #: _____ Location: ☐ Center: ☐ Yes ☐No ☐NA ☐ Close to the corners: ☐ Yes ☐No ☐NA ☐ Distributed evenly horizontally: ☐ Yes ☐No ☐NA ☐ Distributed evenly vertical: ☐ Yes ☐No ☐NA ☐ Other describe: _____
Façade connections at edges: ☐ Originally built full connection (complete woven with the wall) ☐ X connection ☐ T connection ☐ Adjacent with butt joints	Façade connections with interior walls: ☐ Originally built full connection (complete woven with the wall) ☐ X connection ☐ T connection Adjacent with butt joints

V. Indicate location of photographs of conditions taken (Section VII):

(Façade and floor plan)





VI. Description of structural system facade: _____

Type				
Foundations				
Cimentación	**Sub-type**	**Details**	**% of sub-type per facade**	**Condition**
☐ Mark here if system is assumed only	☐ Natural	☐ Solid Rock ☐ Stiff soil ☐ Structure rock	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	☐ Cohesive ☐ Non-cohesive 
	☐ Man made: Stone *"cimentación"* with mud/lime mortar	☐ Rubble stone	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	☐ Cohesive ☐ Non-cohesive 
		☐ Stone masonry	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	☐ Cohesive ☐ Non-cohesive 
Sobrecimiento	**Sub-type**	**Details**	**% of sub-type per facade**	**Condition**
☐ Mark here if system is assumed only	☐ *"Sobrecimiento"* with mud/lime mortar	☐ Rubble stone	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	☐ Cohesive ☐ Non-cohesive 
		☐ Stone masonry	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	☐ Cohesive ☐ Non-cohesive 
Others	**Sub-type**	**Details**	**% of sub-type per facade**	**Condition**
	☐ Walls sitting on natural unmodified ground		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	

Load bearing masonry/quincha facades				
	Sub-type	**Details**	**Location within the facade**	**Graphic at plan**
	☐ Adobe masonry walls	☐ With mud mortar (probably original)	☐ First floor ☐ Second and third floor	
		☐ With mud mortar and insertions of bricks with cement mortar	☐ First floor ☐ Second and third floor	
	☐ Rammed earth walls		☐ First floor ☐ Second and third floor	
	☐ Brick masonry walls	☐ With cement mortar	☐ First floor ☐ Second and third floor	
	☐ Stone masonry walls	☐ With mud mortar	☐ First floor ☐ Second and third floor	
		☐ With lime/cement mortar	☐ First floor ☐ Second and third floor	
	☐ Quincha walls with wooden frames	☐ With cane reed and mud plaster (original)	☐ First floor ☐ Second and third floor	

		☐ With cane reed and cement plaster	☐ First floor ☐ Second and third floor	
		☐ With adobe blocks infill and mud plaster	☐ First floor ☐ Second and third floor	
		☐ With adobe/brick infill and cement plaster	☐ First floor ☐ Second and third floor	
	☐ Reinforced masonry walls	☐ Bricks with embedded concrete columns	☐ First floor ☐ Second and third floor	
		☐ Adobe blocks with embedded concrete	☐ First floor ☐ Second and third floor	
	☐ Concrete frame with unreinforced masonry walls	☐ Brick	☐ First floor ☐ Second and third floor	
		☐ Adobe	☐ First floor ☐ Second and third floor	

Plaster

	Sub-type	Details	% of sub-type on the facade	Graphic at plan
☐ Yes ☐ No	☐ Mud/Lime plaster	☐ Painted	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	
		☐ Not-painted	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	
	☐ Cement plaster		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	
	☐ Painted surface only		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐100%	

Balconies

	Sub-type	Details	Structural description	Graphic at plan
☐ Yes ☐ No	☐ Jetty (enclosed)	☐ Across entire façade ☐ Part of the façade ☐ #: _____ ☐ Corner	☐ Stone flooring ☐ Wooden flooring	
	☐ Open	☐ Across entire façade ☐ Part of the façade #: _____ ☐ Corner	☐ Stone flooring ☐ Wooden flooring	

Buttresses

	Sub-type and # per sector	Condition	Graphic at plan
☐ Yes ☐ No	☐ Adobe: #: _____	Masonry fabric: ☐ Good ☐ Fair ☐ Poor	
		☐ Originally built full connection (complete woven with the wall)	
		☐ Adjacent with butt joints	
		☐ Later addition, superficial connection	
	☐ Adobe and brick/stone: #: _____	Masonry fabric: ☐ Good ☐ Fair ☐ Poor	IN BLUE
		☐ Originally built full connection (complete woven with the wall)	
		☐ Adjacent with butt joints	
		☐ Later addition, superficial connection	

	☐ Brick: #: _____	Masonry fabric: ☐ Good ☐ Fair ☐ Poor	IN BLACK
		☐ Originally built full connection (complete woven with the wall)	
		☐ Adjacent with butt joints	
		☐ Later addition, superficial connection	

Porticos

	Location @ other walls	Details	Numbers	
☐ None	☐ Across part of the facade	☐ Brick/Stone ☐ Wood	#: _____	
	☐ Across half of the facade	☐ Brick/Stone ☐ Wood	#: _____	
	☐ Across all facade	☐ Brick/Stone ☐ Wood	#: _____	
	Length of portico vs. length of façade:			

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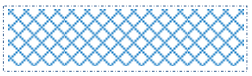
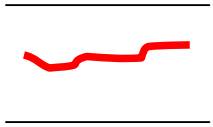
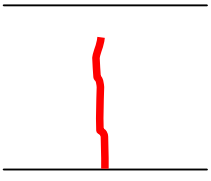
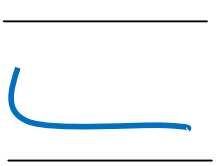
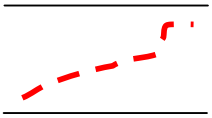
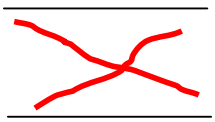
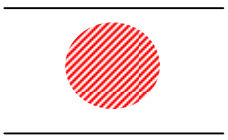
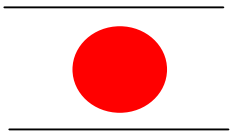
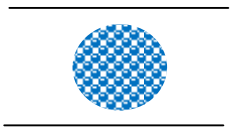
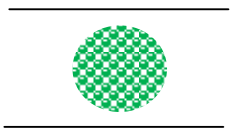
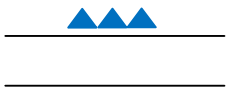
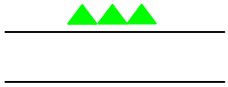
VII. Conditions impacting seismic performance of facade: _____

General impression: ☐ Stable ☐ Instable

Adobe/Quincha walls

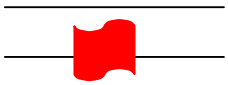
Conditions:	Details	Location	Graphic at facade
Total collapse: ☐ Yes ☐ No		☐ All floors ☐ Third floor ☐ Second floor ☐ First floor	
Partial collapse (no consider plaster): ☐ Yes ☐ No	☐ All facade ☐ ½ of facade ☐ 3/4 of facade ☐ 1/4 of facade	☐ Third floor ☐ Second floor ☐ First floor ☐ At corners	
Settlement of facade:) ☐ Yes ☐ No		☐ Center ☐ Edges	
Corner damage: (The "V" thing) ☐ Yes ☐ No		☐ All height ☐ Upper	
Out of plane displacement: ☐ Yes ☐ No	☐ Inward ☐ Outward ☐ Bowing	☐ Lower ☐ Upper ☐ Middle ☐ At corners	
Structural cracking: ☐ Yes ☐ No	☐Horizontal Average width:_____	☐ Lower ☐ Upper ☐ Center ☐ At the piers (between openings and end of the façade) ☐ At the spandrel ☐ From the openings	
	☐Vertical: Average width:_____	☐ Lower ☐ Upper ☐ Center ☐ At the piers (between openings and end of the façade) ☐ At the spandrel ☐ From the openings ☐ At corners	

	☐Flexural	☐ Wall to wall ☐ Wall to mid-wall	
	☐Diagonal	☐ Top to bottom ☐ Top to mid-height ☐ Bottom to mid-height ☐ At the piers (between openings and end of the façade) ☐ At the spandrel	
	☐ X-shaped	☐ Top to bottom ☐ Top to mid-height ☐ Bottom to mid-height ☐ At the piers (between openings and end of the façade) ☐ At the spandrel	
Plaster loss: ☐ Yes ☐ No	☐ Center ☐ Corners ☐ Lower ☐ Upper ☐ Everywhere		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% of facade show plaster detachment
Detachment of plasters: ☐ Yes ☐ No	☐ Center ☐ Corners ☐ Lower ☐ Upper ☐ Everywhere		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% of facade show plaster loss
Erosion: ☐ Yes ☐ No	☐ Upper ☐ Center ☐ Lowers ☐ At corners Average depth of loss: ☐ <0.01 ☐ 0.01-0.05 ☐ > 0.05		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% of the facade show erosion

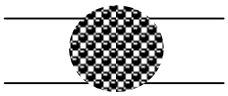
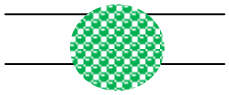
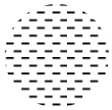
Beetle damage, (Round isolated holes): ☐ No ☐ Yes With: ☐ Disaggregation	☐ Center ☐ Corners ☐ Lower ☐ Upper		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% of walls show beetle damage
Moisture damage: ☐ No ☐ Yes With: ☐ Detachment ☐ Blistering ☐ Disaggregation ☐ Erosion ☐ Discoloration ☐ Rising damp ☐ Mold ☐ Vegetation	☐ Center ☐ Corners ☐ Top ☐ Bottom		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% of walls show moisture damage
Presence of vegetation: ☐ Yes ☐ No	☐ Center ☐ Corners ☐ Top ☐ Bottom		☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% of walls has vegetation

Wooden beams, rafters, quincha frames:

Deformation:
☐ No
☐ Yes



☐Wall plate	☐ Center ☐ At intersection	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show deformation
☐Wooden lintels	☐ Center ☐ At connections	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show deformation
☐Rafters ("*Pares*") Location:	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show deformation
☐Joists ("*viguetas*") Location:	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show deformation
☐Arches/Ribs	☐ Center ☐ At the support	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show deformation
Quincha		
☐Vertical posts ☐Diagonal posts	☐ Center ☐ At intersection	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show deformation
Balconies		
Drop of support	☐ At the edges ☐ At the center	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show drop of support

	Floor deformation	☐ At the edges ☐ At the center	☐<25% ☐ 25-50% ☐ 50-75% ☐ 75-100% 100% of balconies show floor deformation
Rotting: ☐ No ☐ Yes 	☐Wall plate	☐ Center ☐ At intersection	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show rotting
	☐Wooden lintels	☐ Center ☐ At connections	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show rotting
	☐Rafters ("*Pares*") Location:	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show rotting
	☐Joists ("*viguetas*") Location:	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show rotting
	☐Arches/Ribs	☐ Center ☐ At the support	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show rotting
	Quincha		
	☐Vertical posts ☐Diagonal posts	☐ Center ☐ At intersection	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show rotting
Termite damage (Evidence of termites wings, frass): ☐ No ☐ Yes 	☐Wall plate	☐ Center ☐ At intersection	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show termite damage
	☐Wooden lintels	☐ Center ☐ At connections	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show termite damage
	Quincha frames		
	☐Vertical posts ☐Diagonal posts	☐ Center ☐ At intersection	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show termite damage
	Adobe masonry - (Usually located at the bottom of the façade)		
	☐ Yes ☐ No	☐ All façade ☐ Corners ☐ Center	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show termite damage
Connections			
Corrosion on metal anchors/nails): ☐ No ☐ Yes 	☐Anchors	☐ Top of walls ☐ Bottom	
	☐Bars	☐ Center ☐ At the edges	
Failure/Disconnections: ☐ No ☐ Yes	☐"*Cimentacion*"	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show failure

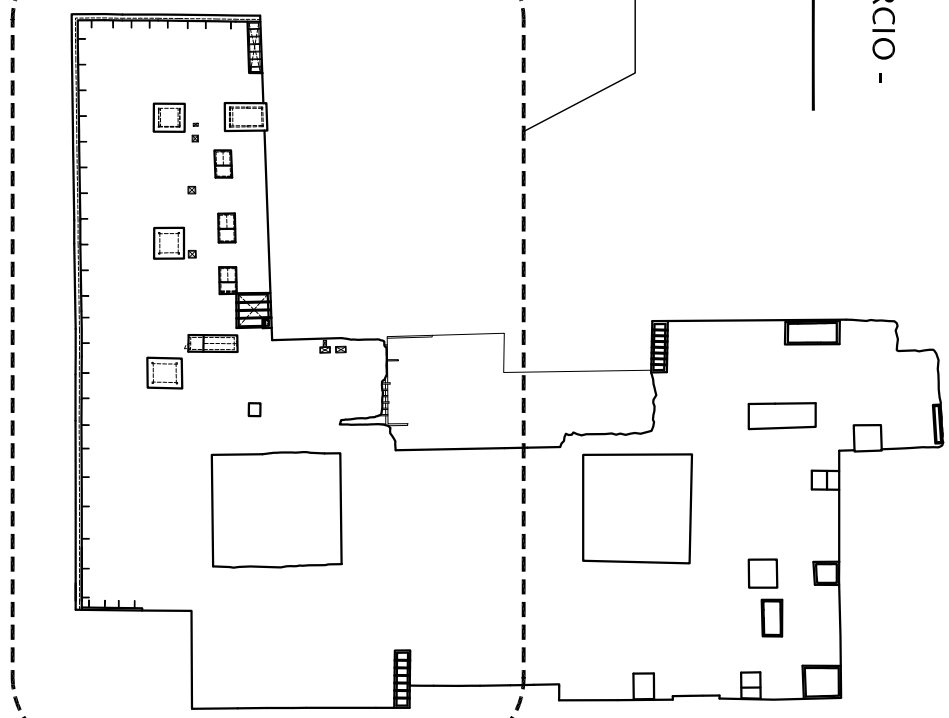
☐ "*Sobrecimiento*"	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show failure
Wall to wall: ☐Edge connection ☐Internal T connection	☐ All height ☐ Upper ☐ Lower	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show failure
☐Buttresses	☐ All height ☐ Upper ☐ Lower	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show failure
☐ Wall plate	☐ Partial ☐ All length of facade	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show failure
☐Lintels	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show failure
☐Floor/Façade connections	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show failure
☐Roof/Top of the facade connections	☐ Center ☐ At the edges	☐ <25% ☐ 25-50% ☐ 50-75% ☐ 75-100% ☐ 100% show failure

APPENDIX B

Architectural Drawings

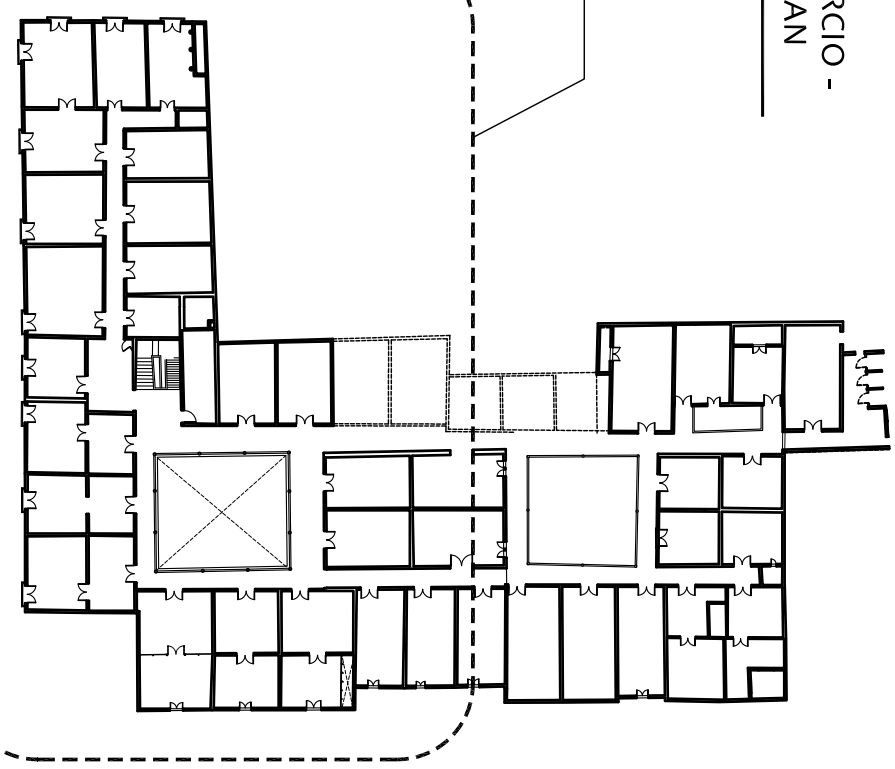
HOTEL EL COMERCIO -
ROOF PLAN

Drawing HC-5



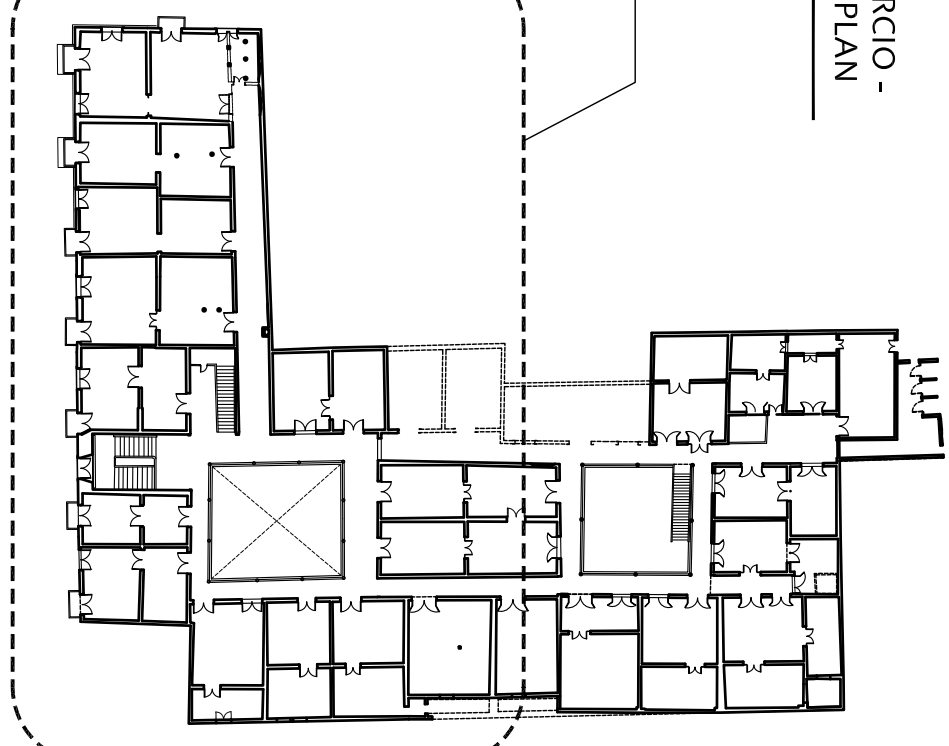
HOTEL EL COMERCIO -
THIRD FLOOR PLAN

Drawing HC-4



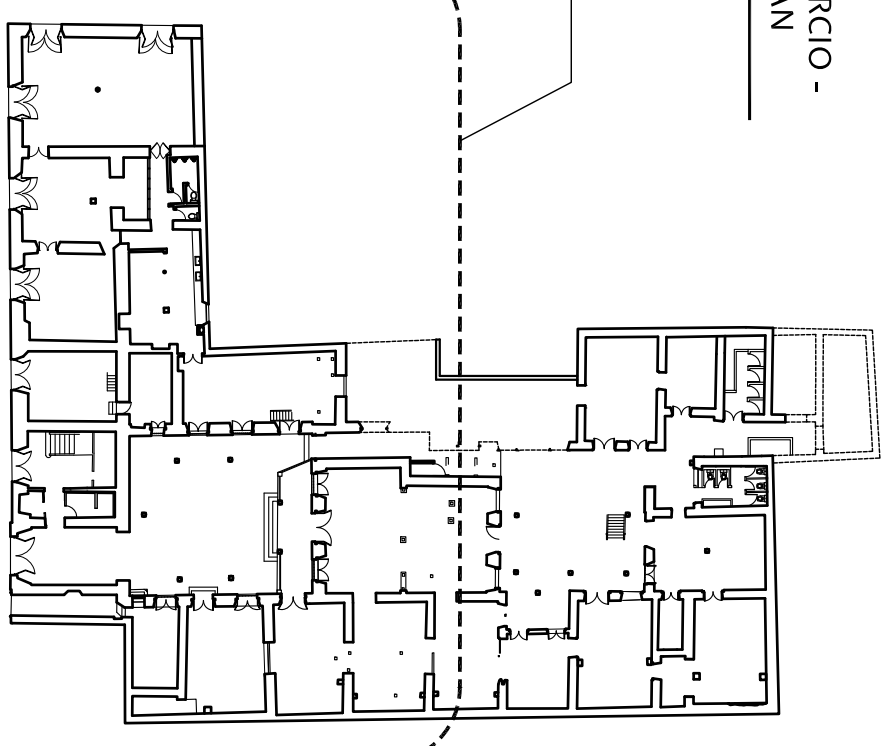
HOTEL EL COMERCIO -
SECOND FLOOR PLAN

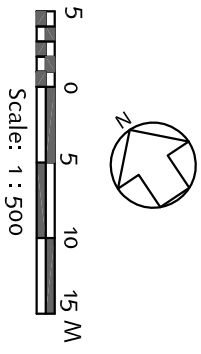
Drawing HC-3



HOTEL EL COMERCIO -
FIRST FLOOR PLAN

Drawing HC-2





SEISMIC RETROFITTING PROJECT
The Earthen Architecture Initiative

The Getty Conservation Institute
UNIVERSITY OF BATH
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
HOTEL EL COMERCIO
Lima, Perú

Sheet Title:
Reference Floor Plans
Existing Conditions

Base Drawing Prepared By:
Drawn by Junior Cárdenas and
Provided by the Instituto Nacional de Cultura of Perú

Survey Facilitator:
Universidad Católica Sedes Sapientiae

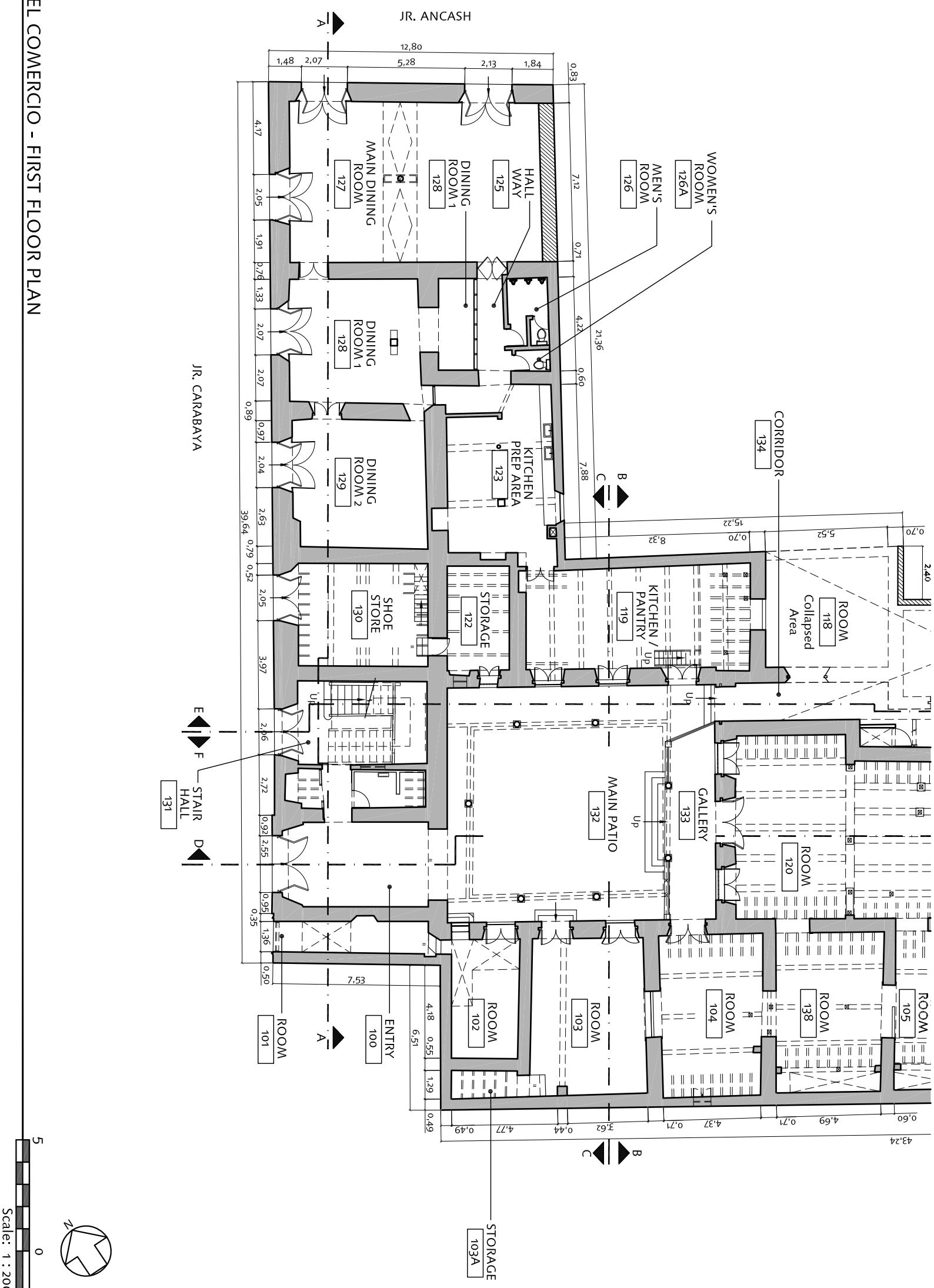
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:500

Sheet No.:
HC-1

HOTEL EL COMERCIO - FIRST FLOOR PLAN



SEISMIC RETROFITTING PROJECT
The Earthen Architecture Initiative

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PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
HOTEL EL COMERCIO
Lima, Perú

Sheet Title:
First Floor Plan
Existing Conditions

Base Drawing Prepared By:
Drawn by Junior Cárdenas and Provided by the Instituto Nacional de Cultura of Perú

Survey Facilitator:
Universidad Católica Sedes Sapientiae

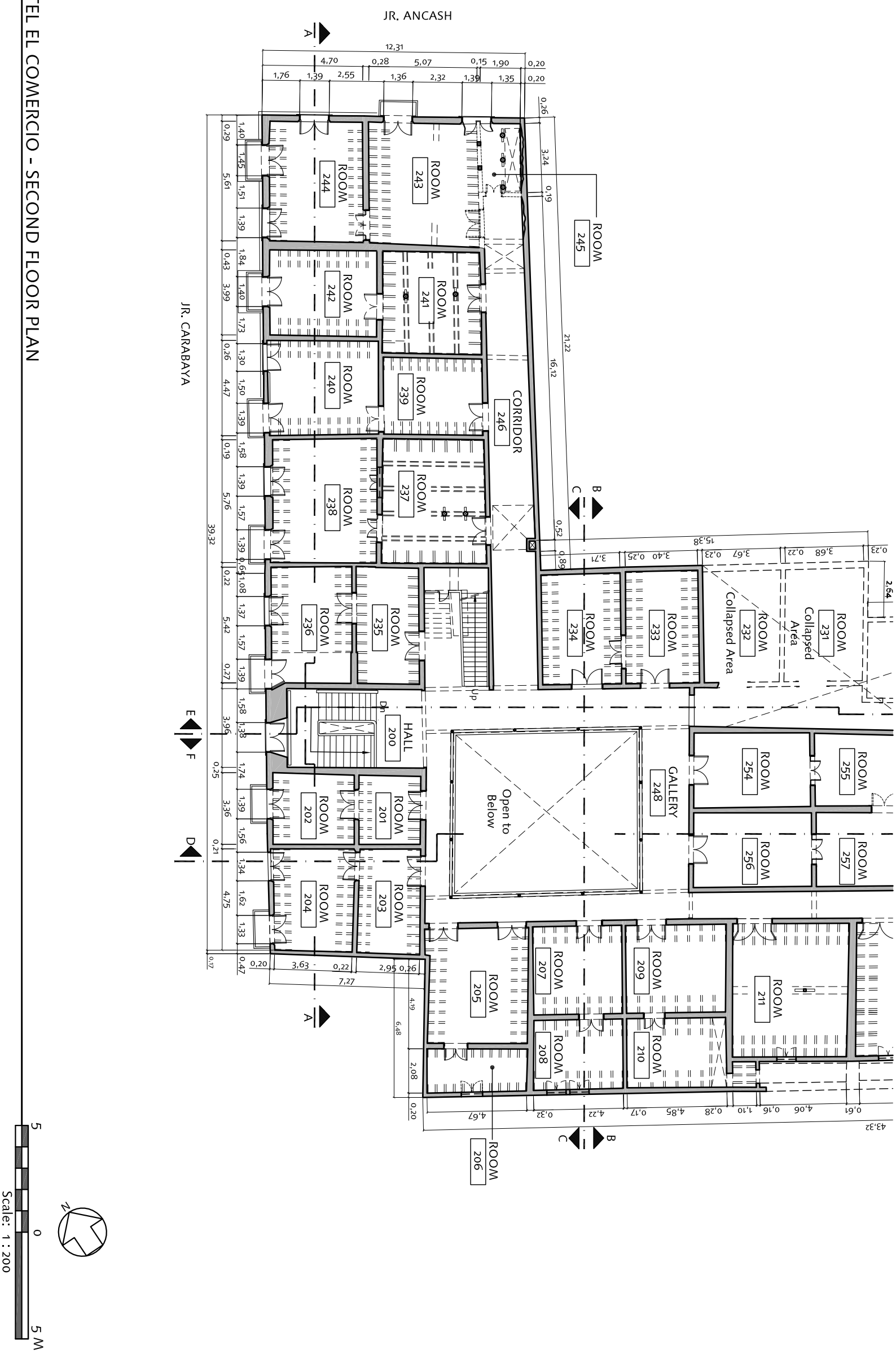
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:200

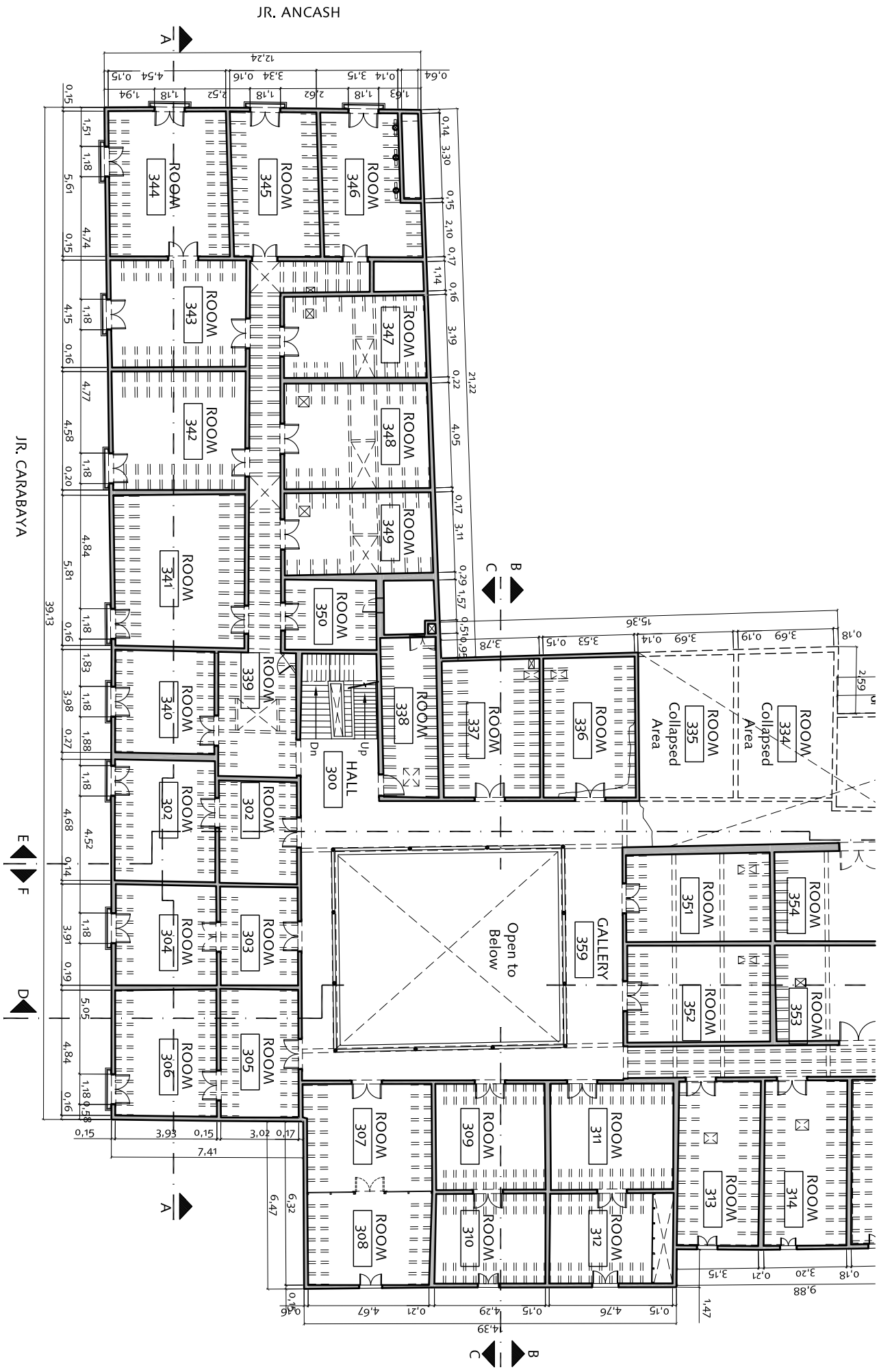
Sheet No.:
HC-2

HOTEL EL COMERCIO - SECOND FLOOR PLAN



SEISMIC RETROFITTING PROJECT The Earthen Architecture Initiative The Getty Conservation Institute UNIVERSITY OF BATH PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ	Building: HOTEL EL COMERCIO Lima, Perú Sheet Title: Second Floor Plan Existing Conditions	Base Drawing Prepared By: Drawn by Junior Cárdenas and Provided by the Instituto Nacional de Cultura of Perú Survey Facilitator: Drawing Edited By: S. Lardinois and C. Cancino	Date: May 16, 2011 Scale: 1:200 Sheet No.: HC-3

HOTEL EL COMERCIO - THIRD FLOOR PLAN



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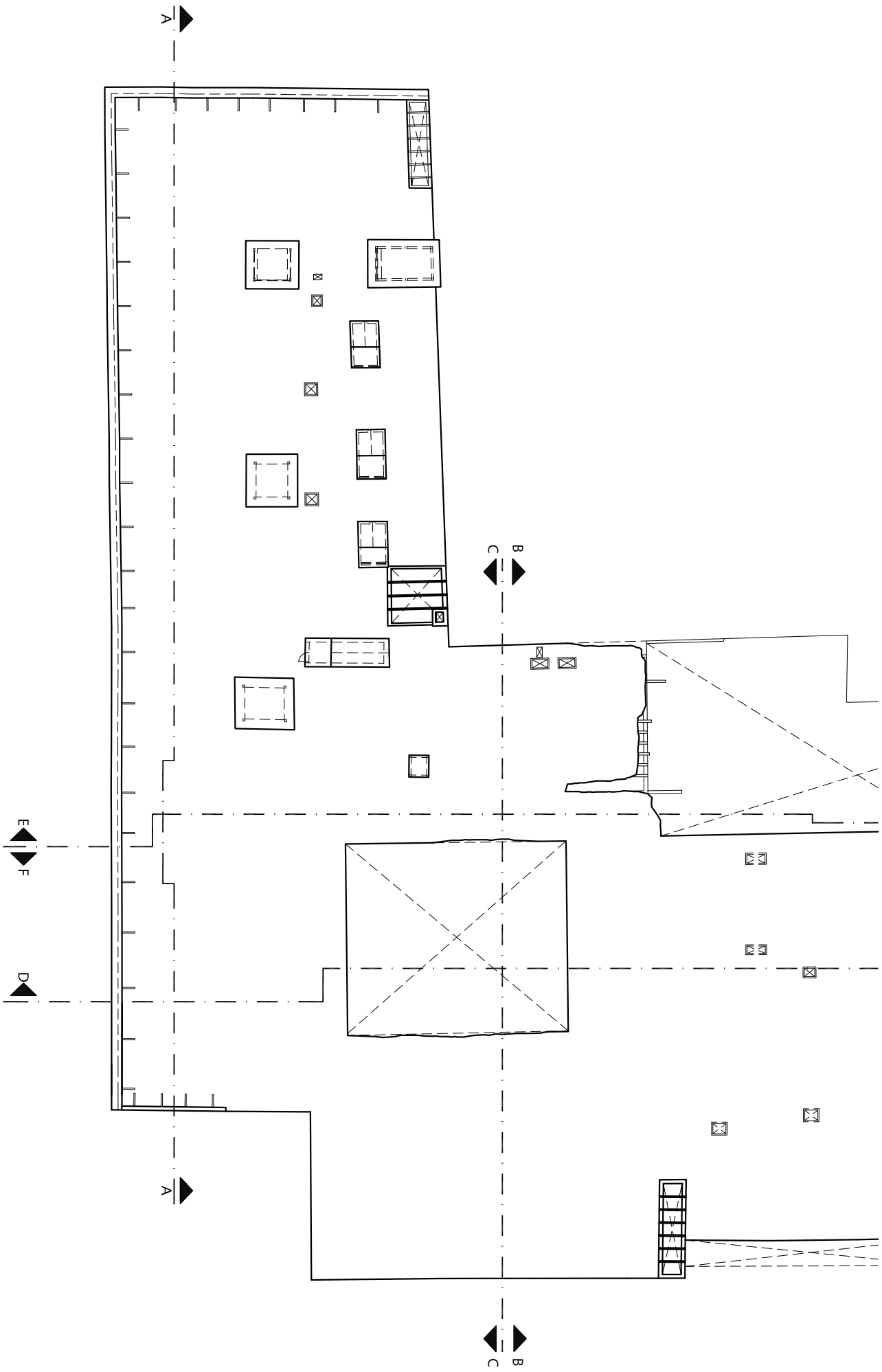
The Earthen Architecture Initiative

The Getty Conservation Institute
UNIVERSITY OF BATH
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building: HOTEL EL COMERCIO, Lima, Perú		Base Drawing Prepared By: Drawn by Junior Cárdenas and Provided by the Instituto Nacional de Cultura of Perú	Date: May 16, 2011
			Scale: 1:200
Sheet Title: Third Floor Plan, Existing Conditions		Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: HC-4
		Drawing Edited By: S. Lardinois and C. Cancino	

HOTEL EL COMERCIO - ROOF PLAN



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UNIVERSITY OF BATH

PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
HOTEL EL COMERCIO
Lima, Perú

Sheet Title:
Roof Plan
Existing Conditions

Base Drawing Prepared By:
Drawn by Junior Cárdenas and Provided by the Instituto Nacional de Cultura of Perú

Survey Facilitator:
Universidad Católica Sedes Sapientiae

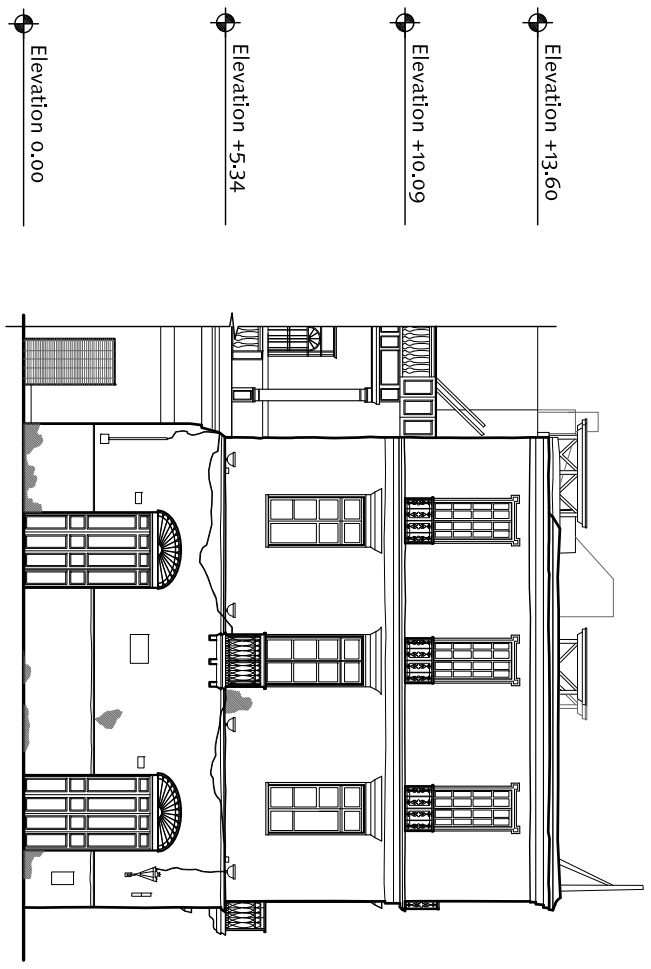
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

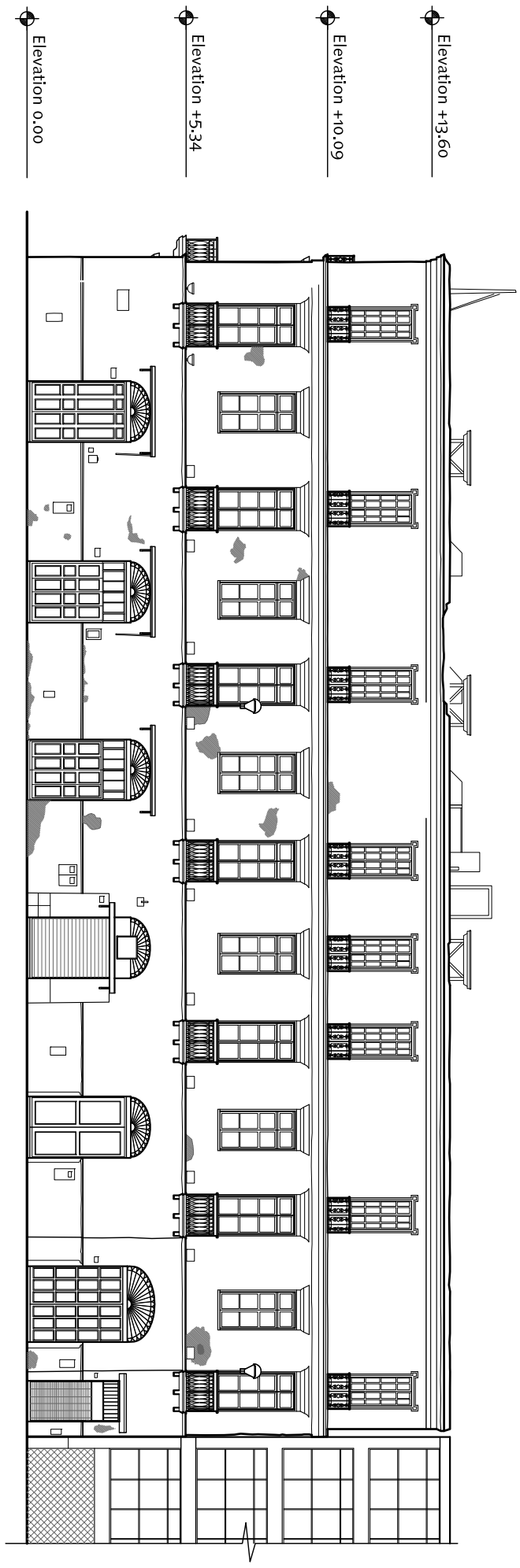
Scale:
1:200

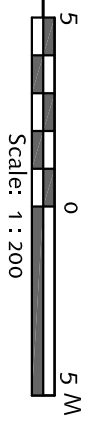
Sheet No.:
HC-5

HOTEL EL COMERCIO - NORTHEST ELEVATION (JR. ANCASH)



HOTEL EL COMERCIO - NORTHWEST ELEVATION (JR. CARABAYA)





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PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
HOTEL EL COMERCIO
Lima, Perú

Sheet Title:
Exterior Elevations
Existing Conditions

Base Drawing Prepared By:
Drawn by Junior Cárdenas and Provided by the Instituto Nacional de Cultura of Perú

Survey Facilitator:
Universidad Católica Sedes Sapientiae

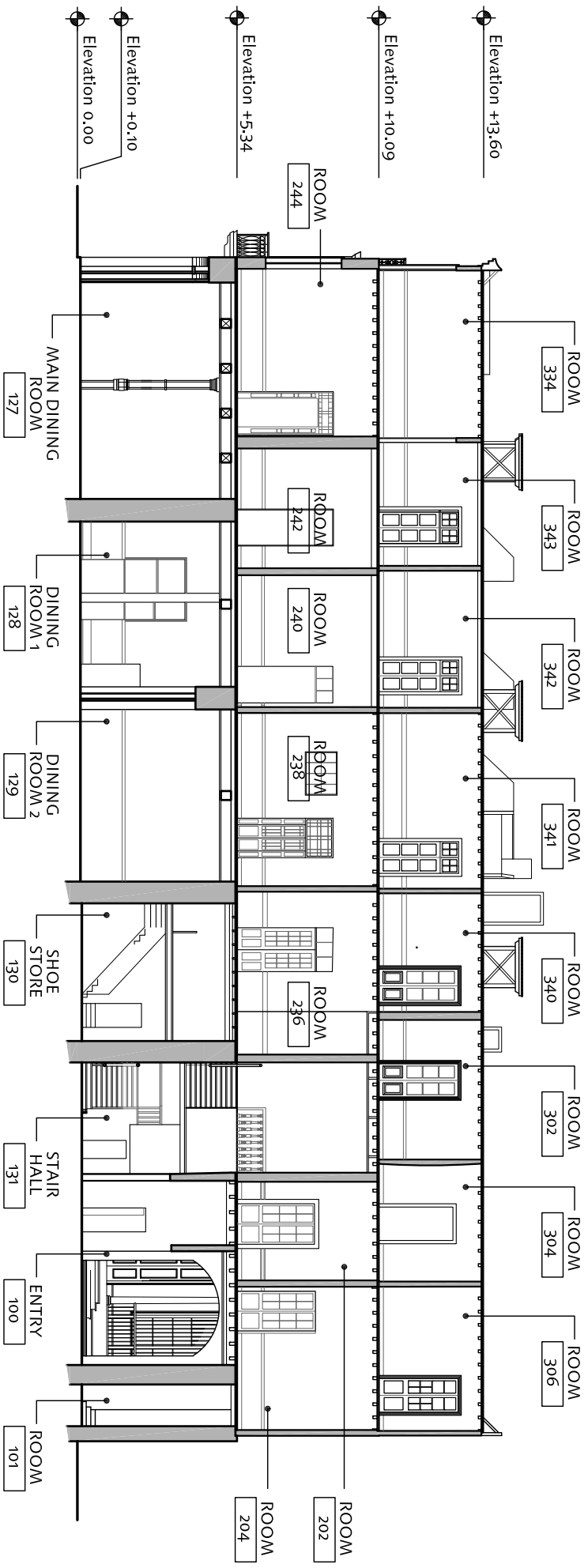
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

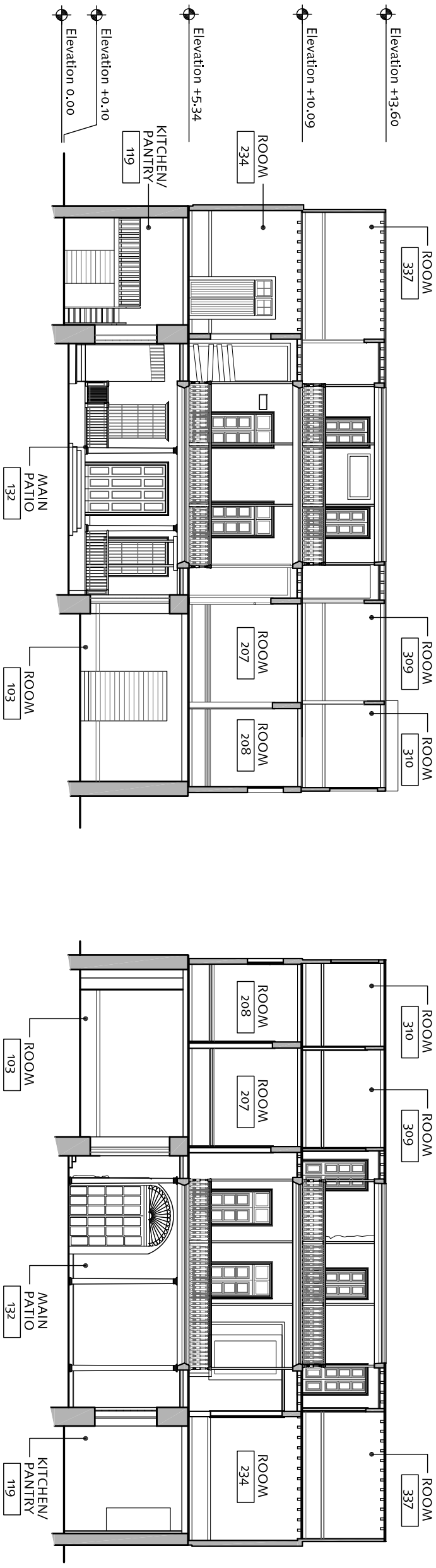
Scale:
1:200

Sheet No.:
HC-6

HOTEL EL COMERCIO - BUILDING SECTION A-A



HOTEL EL COMERCIO - BUILDING SECTION B-B



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PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
HOTEL EL COMERCIO
Lima, Perú

Sheet Title:
Building Sections
Existing Conditions

Base Drawing Prepared By:
Drawn by Junior Cárdenas and Provided by the Instituto Nacional de Cultura of Perú

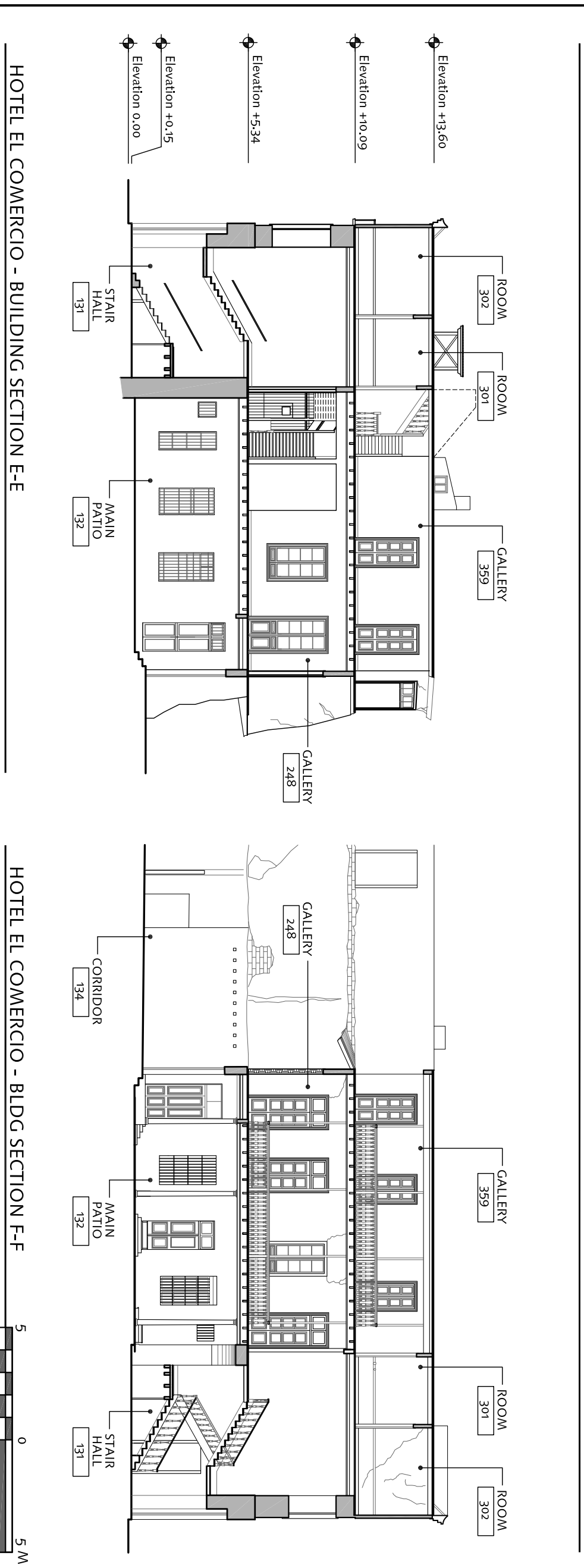
Survey Facilitator:
Universidad Católica Sedes Sapientiae

Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:200

Sheet No.:
HC-7



HOTEL EL COMERCIO - BUILDING SECTION D-D

HOTEL EL COMERCIO - BUILDING SECTION E-E

HOTEL EL COMERCIO - BLDG SECTION F-F

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PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
HOTEL EL COMERCIO
Lima, Perú

Sheet Title:
Building Sections
Existing Conditions

Base Drawing Prepared By:
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Survey Facilitator:
Universidad Católica Sedes Sapientiae

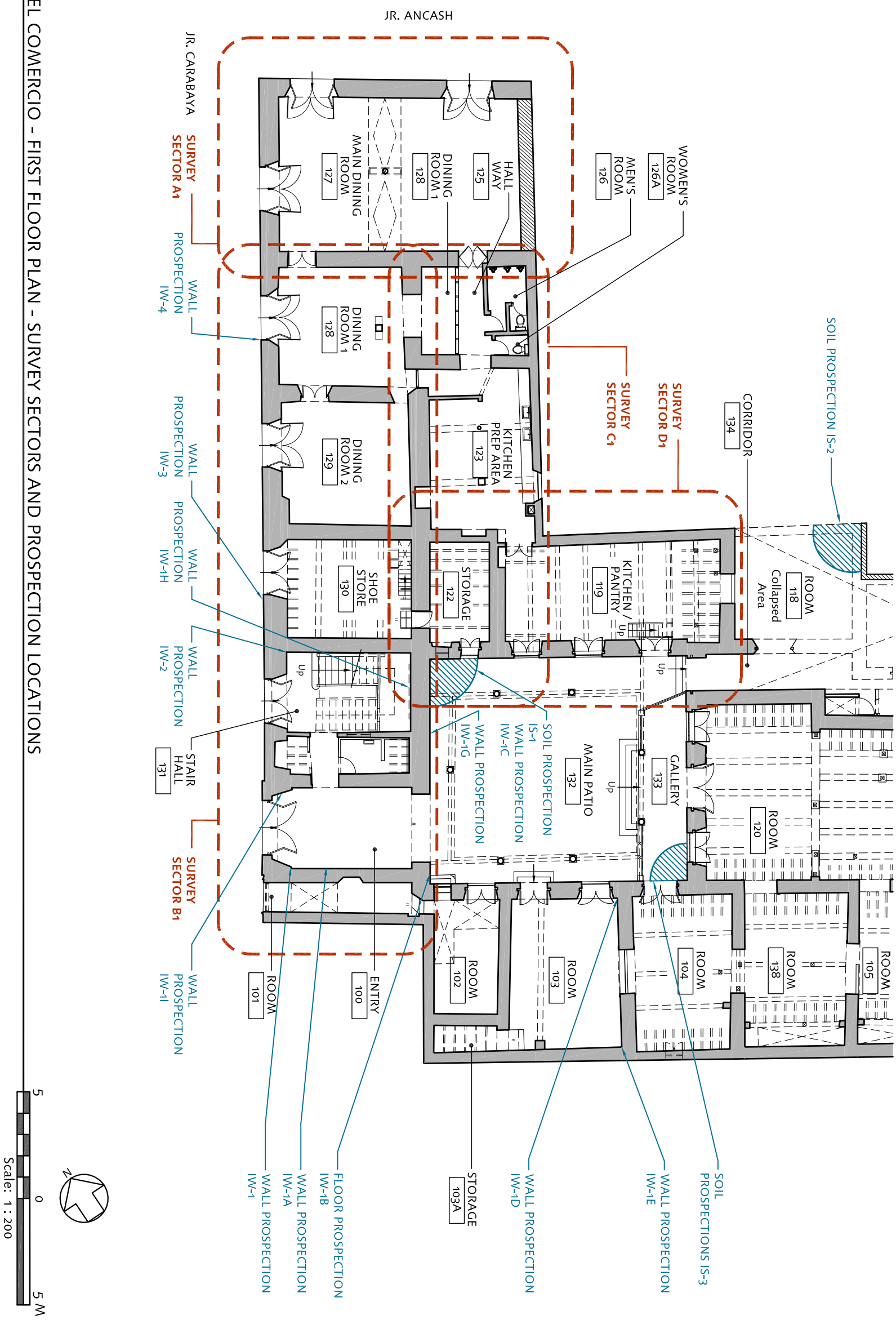
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:200

Sheet No.:
HC-8

HOTEL EL COMERCIO - FIRST FLOOR PLAN - SURVEY SECTORS AND PROSPECTION LOCATIONS



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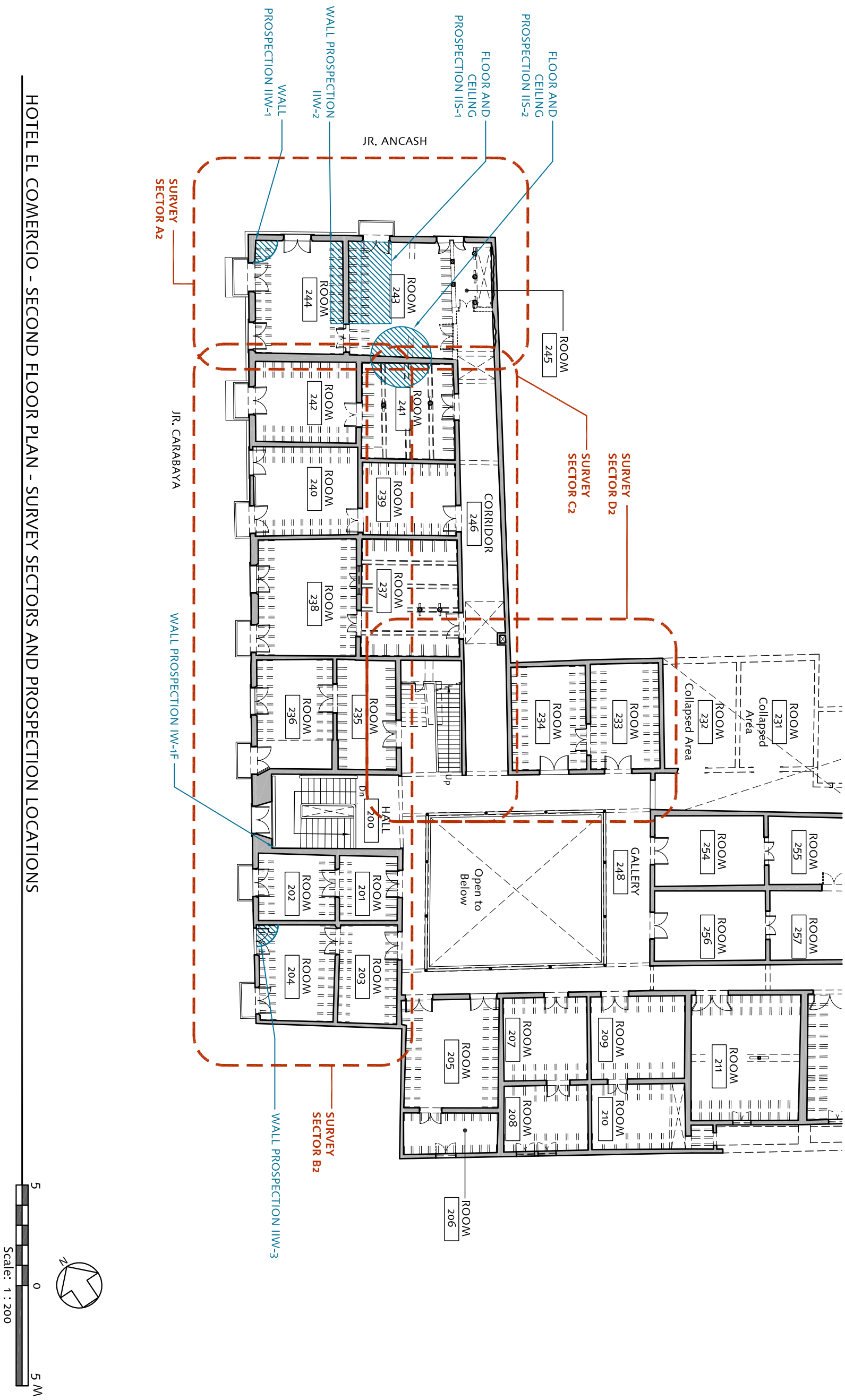
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building: HOTEL EL COMERCIO, Lima, Perú	Base Drawing Prepared By: Drawn by Junior Cárdenas and Provided by the Instituto Nacional de Cultura of Perú	Date: May 16, 2011	
		Scale: 1:200	
Sheet Title: First Floor Plan, Survey Sectors and Prospection Locations	Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: HC-9	
	Drawing Edited By: S. Lardinois and C. Cancino		

HOTEL EL COMERCIO - SECOND FLOOR PLAN - SURVEY SECTORS AND PROSPECTION LOCATIONS



SEISMIC RETROFITTING PROJECT
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Building: HOTEL EL COMERCIO, Lima, Perú	Base Drawing Prepared By: Drawn by Junior Cárdenas and Provided by the Instituto Nacional de Cultura of Perú	Date: May 16, 2011	
		Scale: 1:200	
Sheet Title: Second Floor Plan, Survey Sectors and Prospection Locations	Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: HC-10	
	Drawing Edited By: S. Lardinois and C. Cancino		

HOTEL EL COMERCIO - THIRD FLOOR PLAN -SURVEY SECTORS AND PROSPECTION LOCATIONS

SEISMIC RETROFITTING PROJECT
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The Getty Conservation Institute
UNIVERSITY OF BATH
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
HOTEL EL COMERCIO
Lima, Perú

Sheet Title:
Third Floor Plan
Survey Sectors and
Prospection Locations

Base Drawing Prepared By:
Drawn by Junior Cárdenas and Provided by the Instituto Nacional de Cultura of Perú

Survey Facilitator:
Universidad Católica Sedes Sapientiae

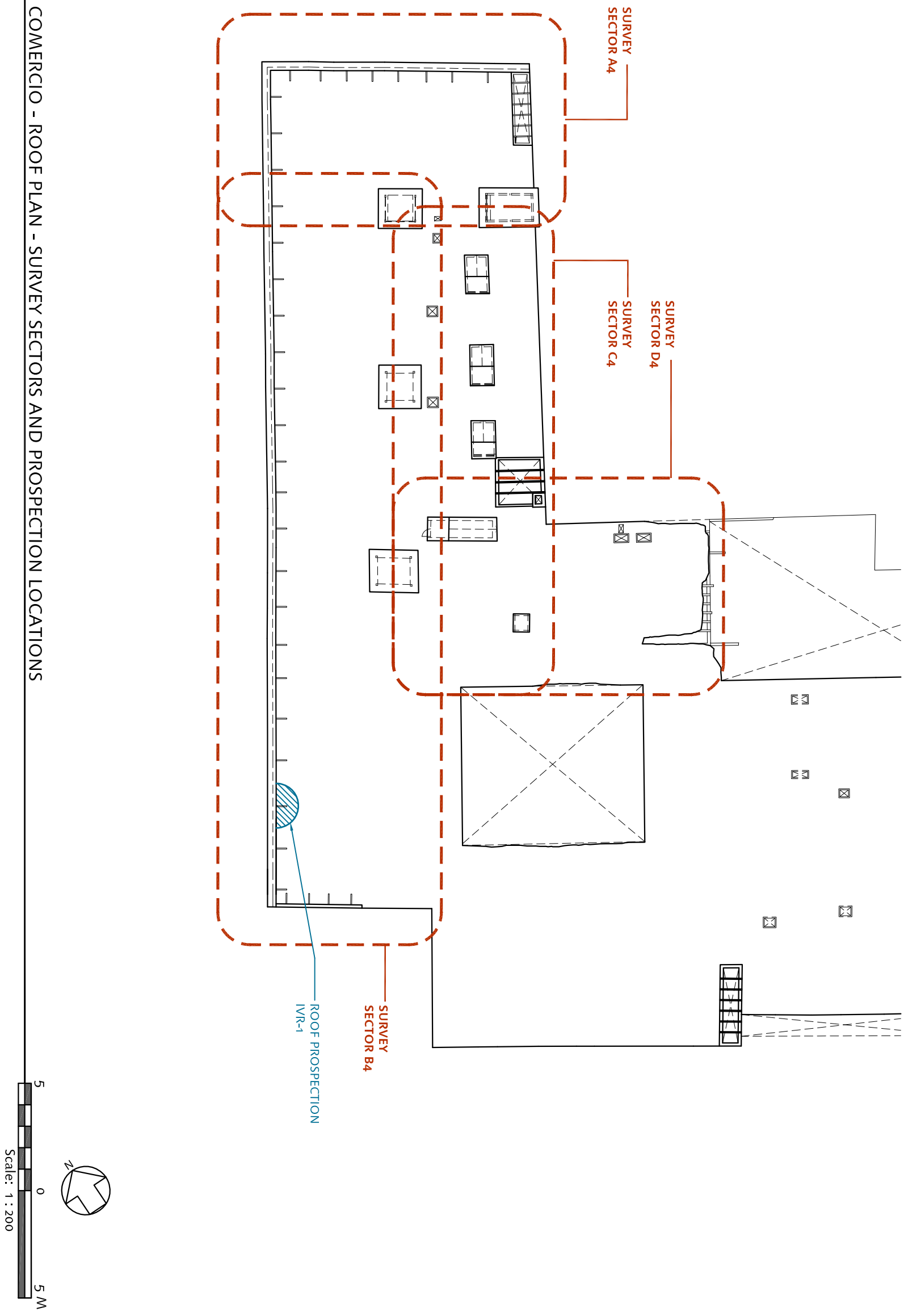
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:200

Sheet No.:
HC-11

HOTEL EL COMERCIO - ROOF PLAN - SURVEY SECTORS AND PROSPECTION LOCATIONS



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PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
HOTEL EL COMERCIO
Lima, Perú

Sheet Title:
Roof Plan
Survey Sectors and
Prospection Locations

Base Drawing Prepared By:
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Provided by the Instituto Nacional de Cultura of Perú

Survey Facilitator:
Universidad Católica Sedes Sapientiae

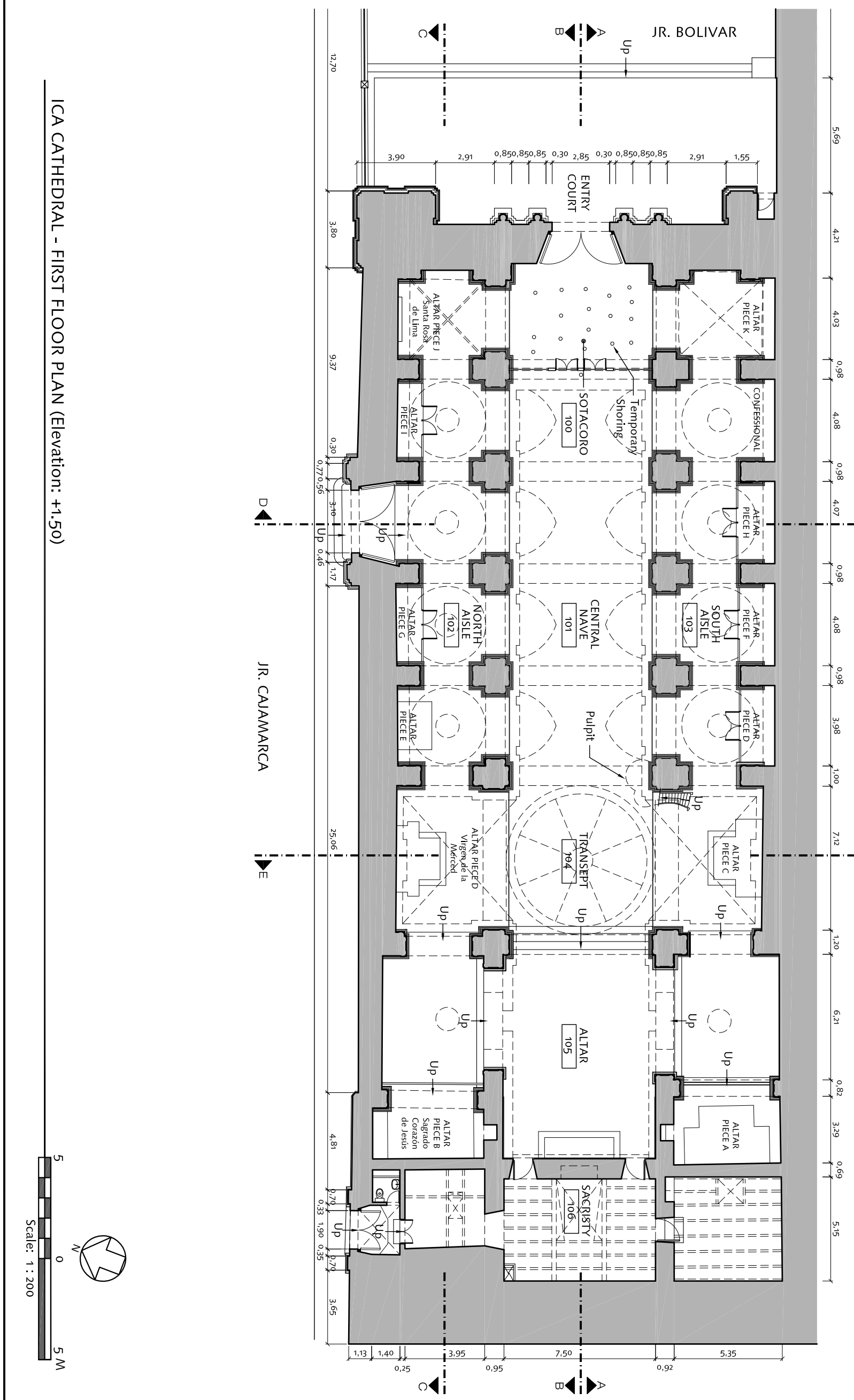
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:200

Sheet No.:
HC-12

ICA CATHEDRAL - FIRST FLOOR PLAN (Elevation: +1.50)



SEISMIC RETROFITTING PROJECT
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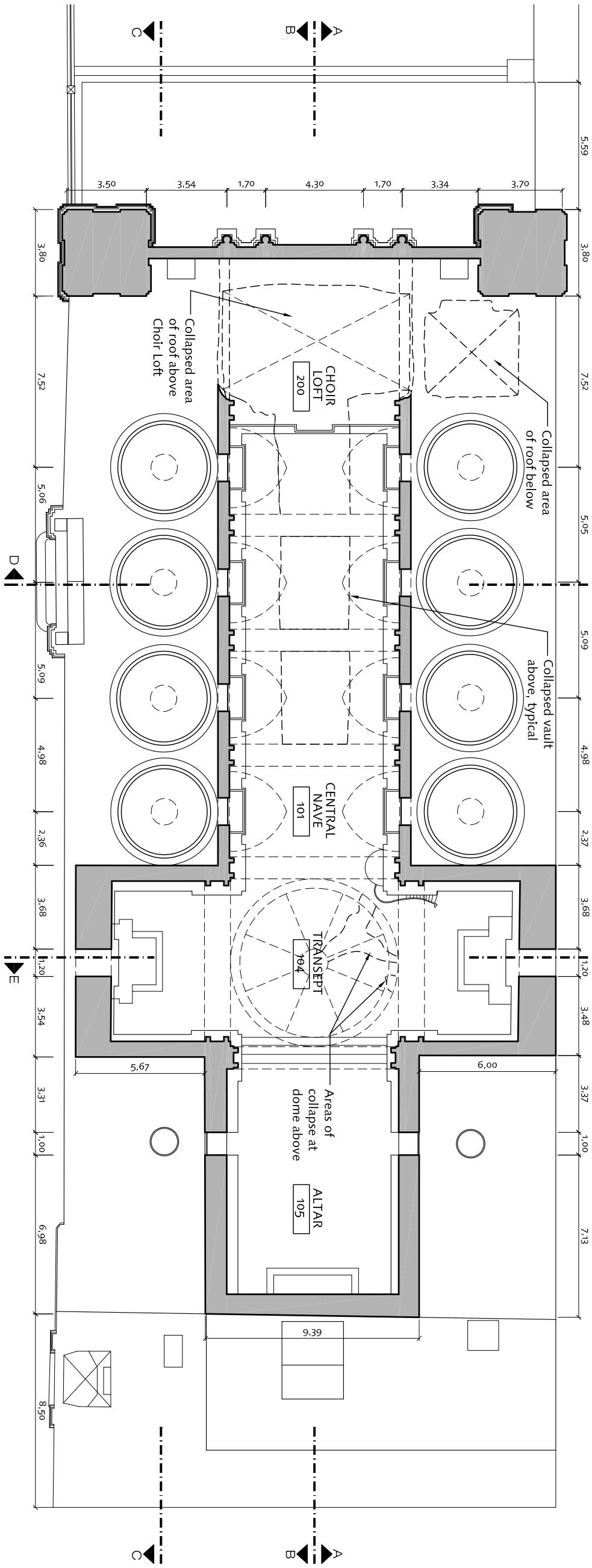
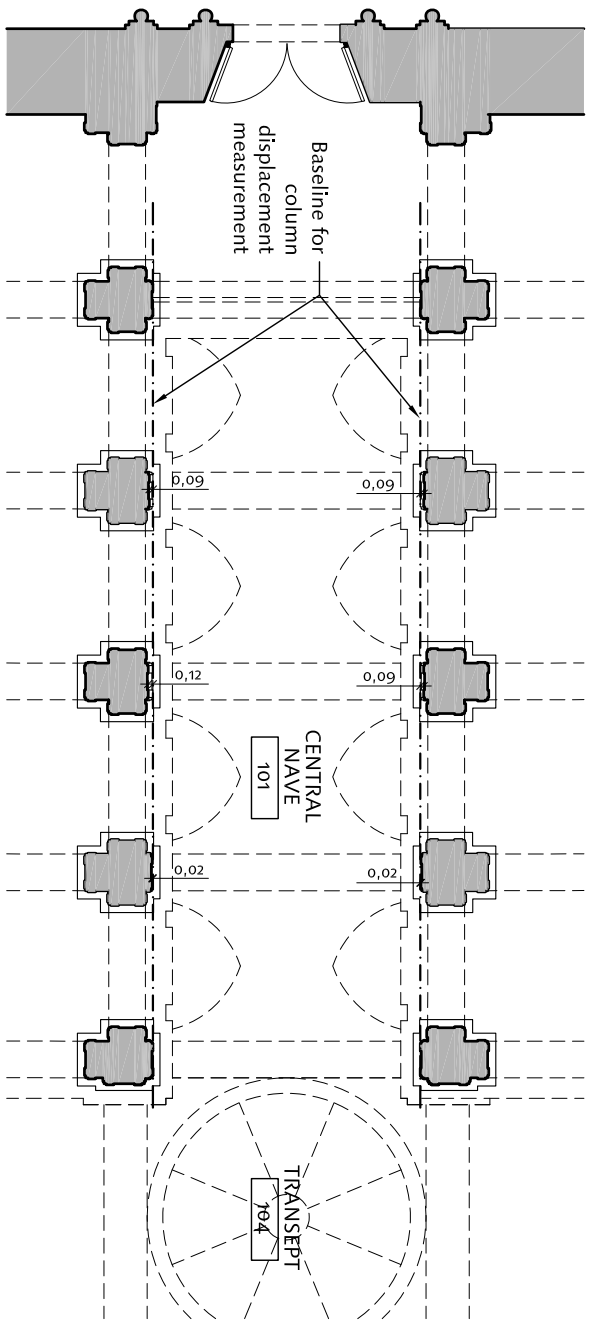
UNIVERSITY OF BATH
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

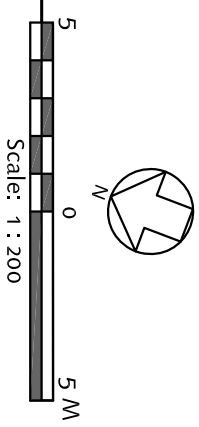
Building: ICA CATHEDRAL, Ica, Perú		Base Drawing Prepared By: Arq. Mirna Soto Medina	Date: May 16, 2011
			Scale: 1:200
Sheet Title: First Floor Plan, Existing Conditions		Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: IC-1
		Drawing Edited By: S. Lardinois and C. Cancino	

ICA CATHEDRAL - UPPER NAVE PLAN (Elevation: +7.40)



ICA CATHEDRAL - PARTIAL UPPER NAVE PLAN, Illustrating the Deformation of Columns (Elevation: +5.30)





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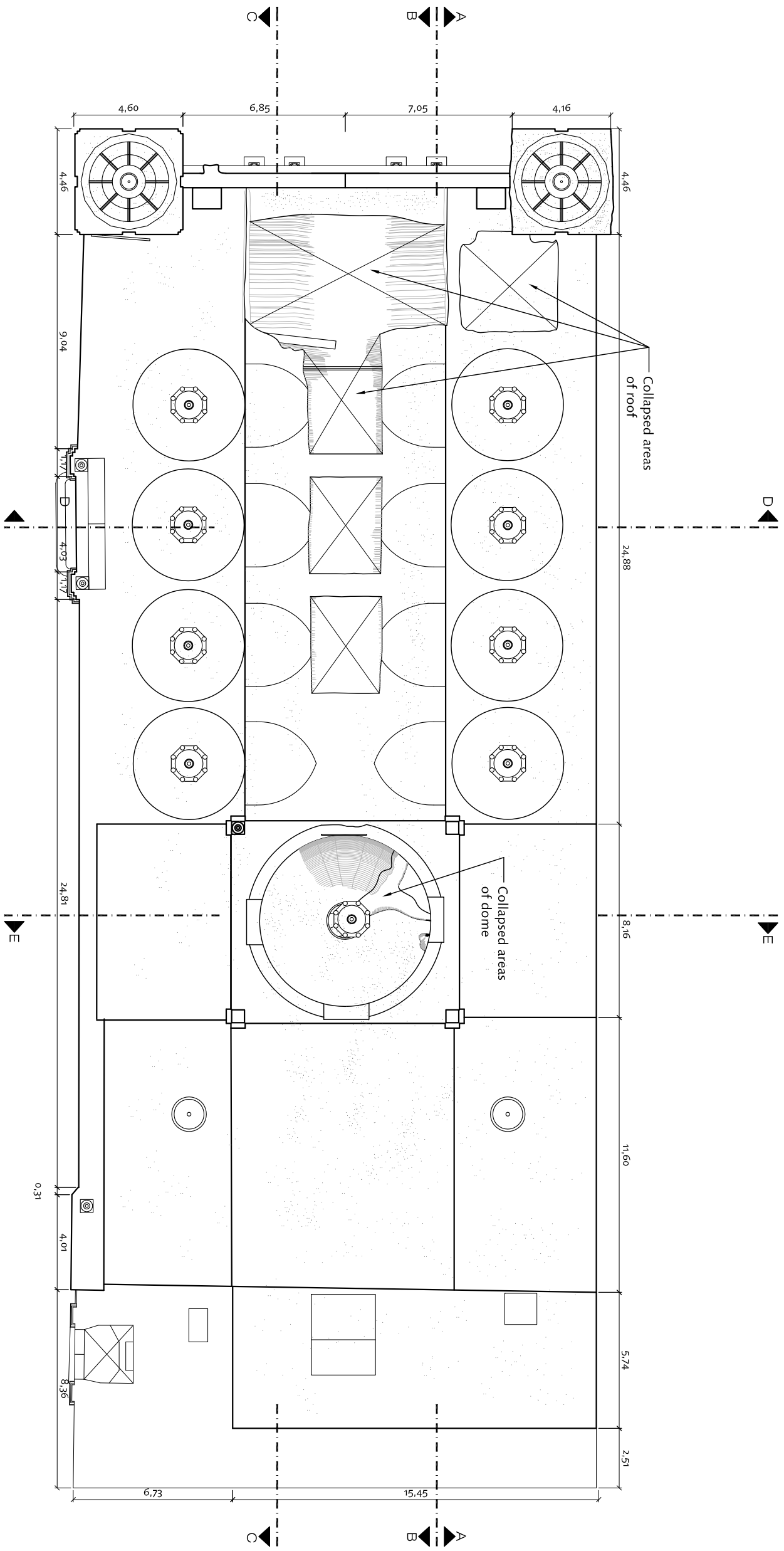
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building: ICA CATHEDRAL, Ica, Perú		Base Drawing Prepared By: Arq. Mirna Soto Medina	Date: May 16, 2011
			Scale: 1:200
Sheet Title: Upper Nave Plans, Existing Conditions		Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: IC-2
		Drawing Edited By: S. Lardinois and C. Cancino	

ICA CATHEDRAL - ROOF PLAN



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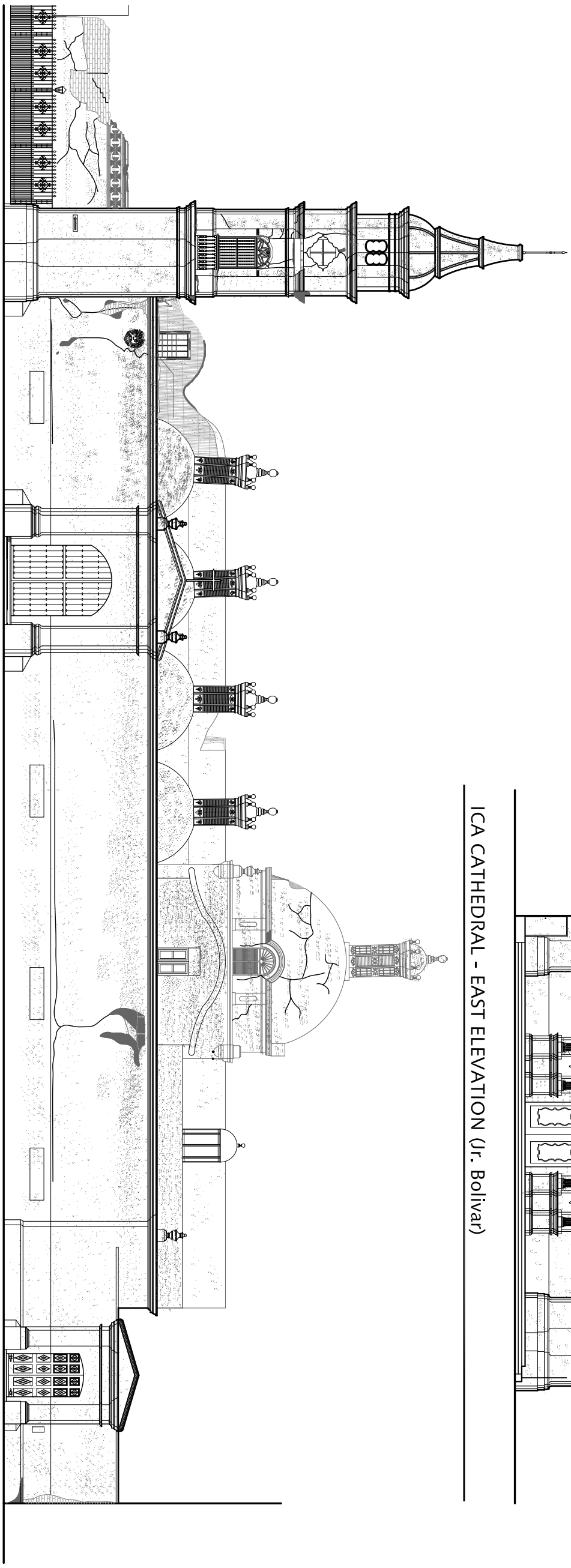
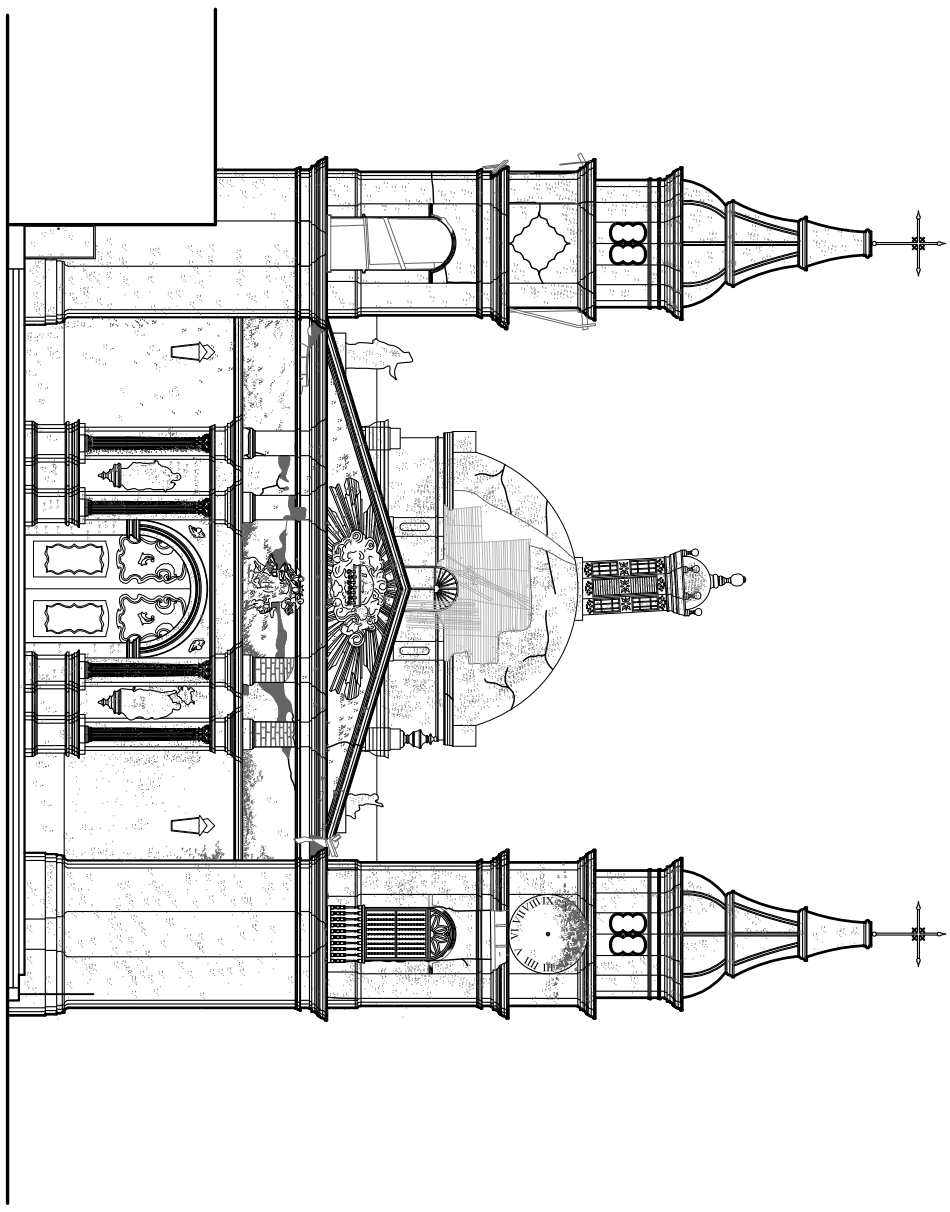
Building: ICA CATHEDRAL, Ica, Perú		Base Drawing Prepared By: Arq. Mirna Soto Medina	Date: May 16, 2011
			Scale: 1:200
Sheet Title: Roof Plan, Existing Conditions		Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: IC-3
		Drawing Edited By: S. Lardinois and C. Cancino	

ICA CATHEDRAL - NORTH ELEVATION (Jr. Cajamarca)



ICA CATHEDRAL - EAST ELEVATION (Jr. Bolivar)



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UNIVERSITY OF BATH
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
ICA CATHEDRAL
Ica, Perú

Sheet Title:
Exterior Elevations
Existing Conditions

Base Drawing Prepared By:
Arq. Mirna Soto Medina

Survey Facilitator:
Universidad Católica Sedes Sapientiae

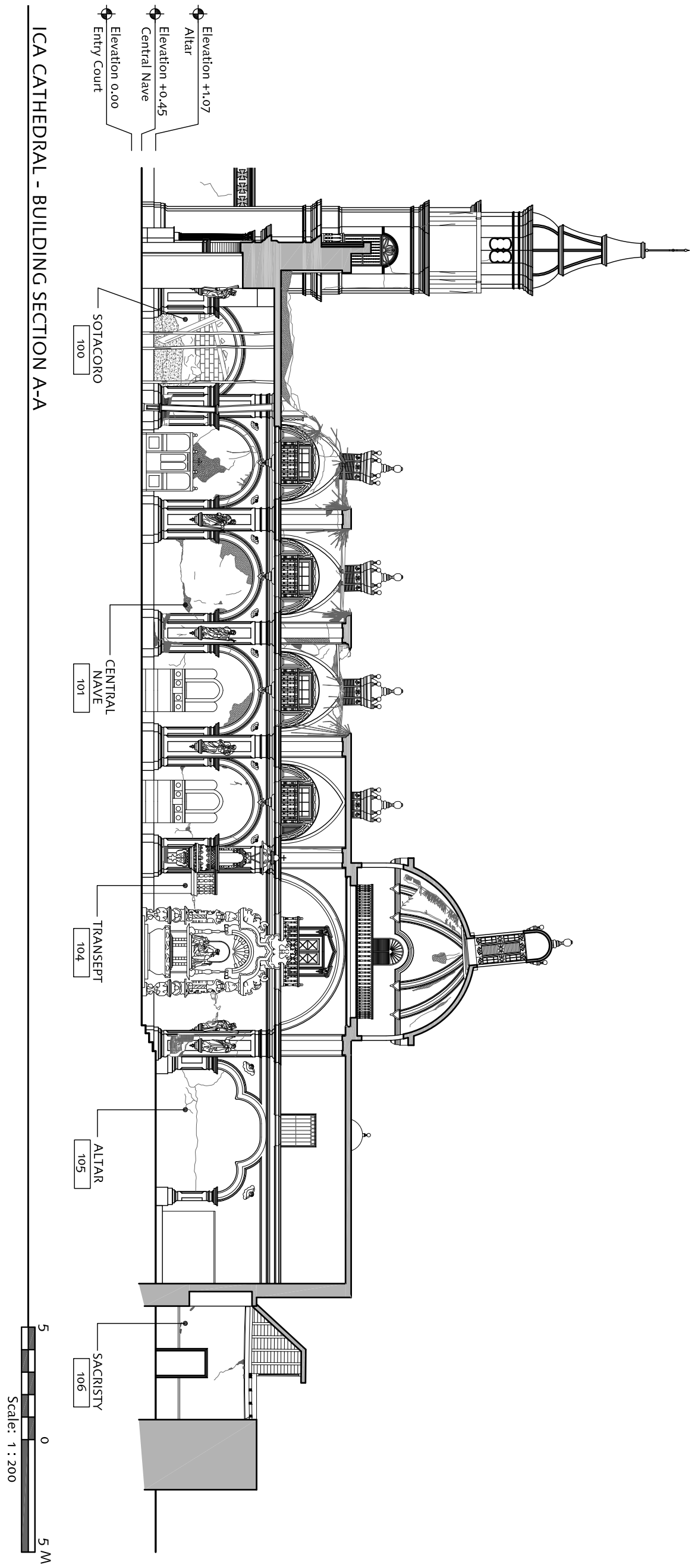
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:200

Sheet No.:
IC-4

ICA CATHEDRAL - BUILDING SECTION A-A



SEISMIC RETROFITTING PROJECT
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University of Bath
Pontificia Universidad Católica del Perú

Building:
ICA CATHEDRAL
Ica, Perú

Sheet Title:
Building Sections
Existing Conditions

Base Drawing Prepared By:
Arq. Mirna Soto Medina

Survey Facilitator:
Universidad Católica Sedes Sapientiae

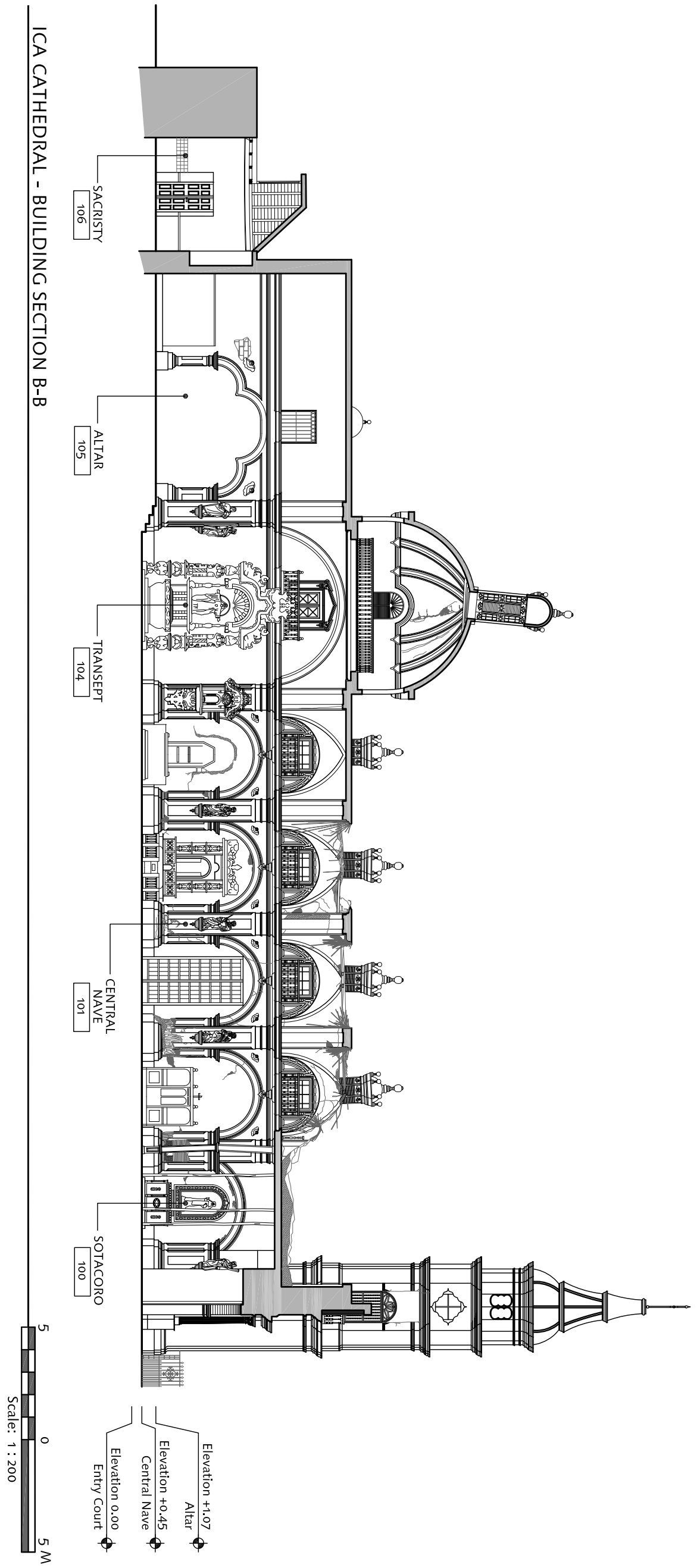
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:200

Sheet No.:
IC-5

ICA CATHEDRAL - BUILDING SECTION B-B



SEISMIC RETROFITTING PROJECT
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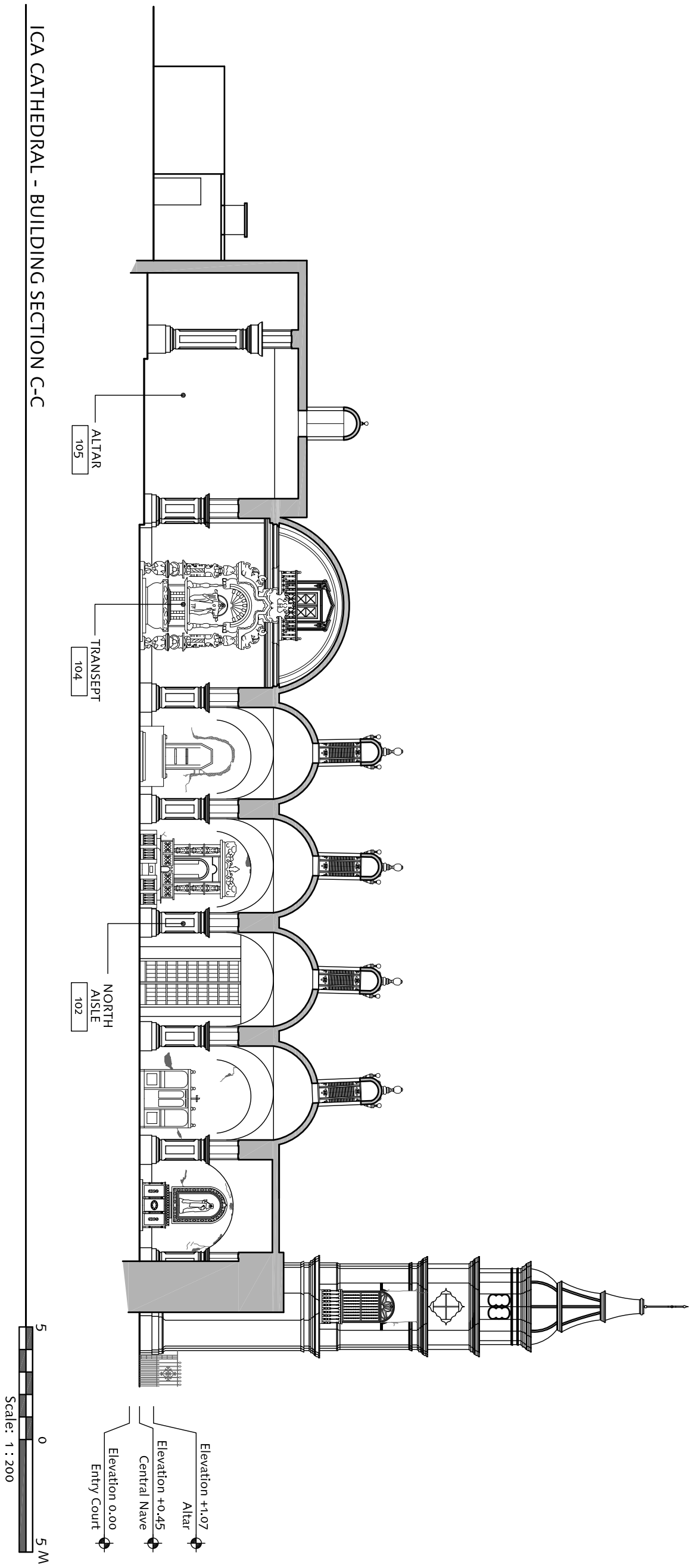
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building: ICA CATHEDRAL, Ica, Perú		Base Drawing Prepared By: Arq. Mirna Soto Medina	Date: May 16, 2011
			Scale: 1:200
Sheet Title: Building Sections Existing Conditions		Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: IC-6
		Drawing Edited By: S. Lardinois and C. Cancino	

ICA CATHEDRAL - BUILDING SECTION C-C



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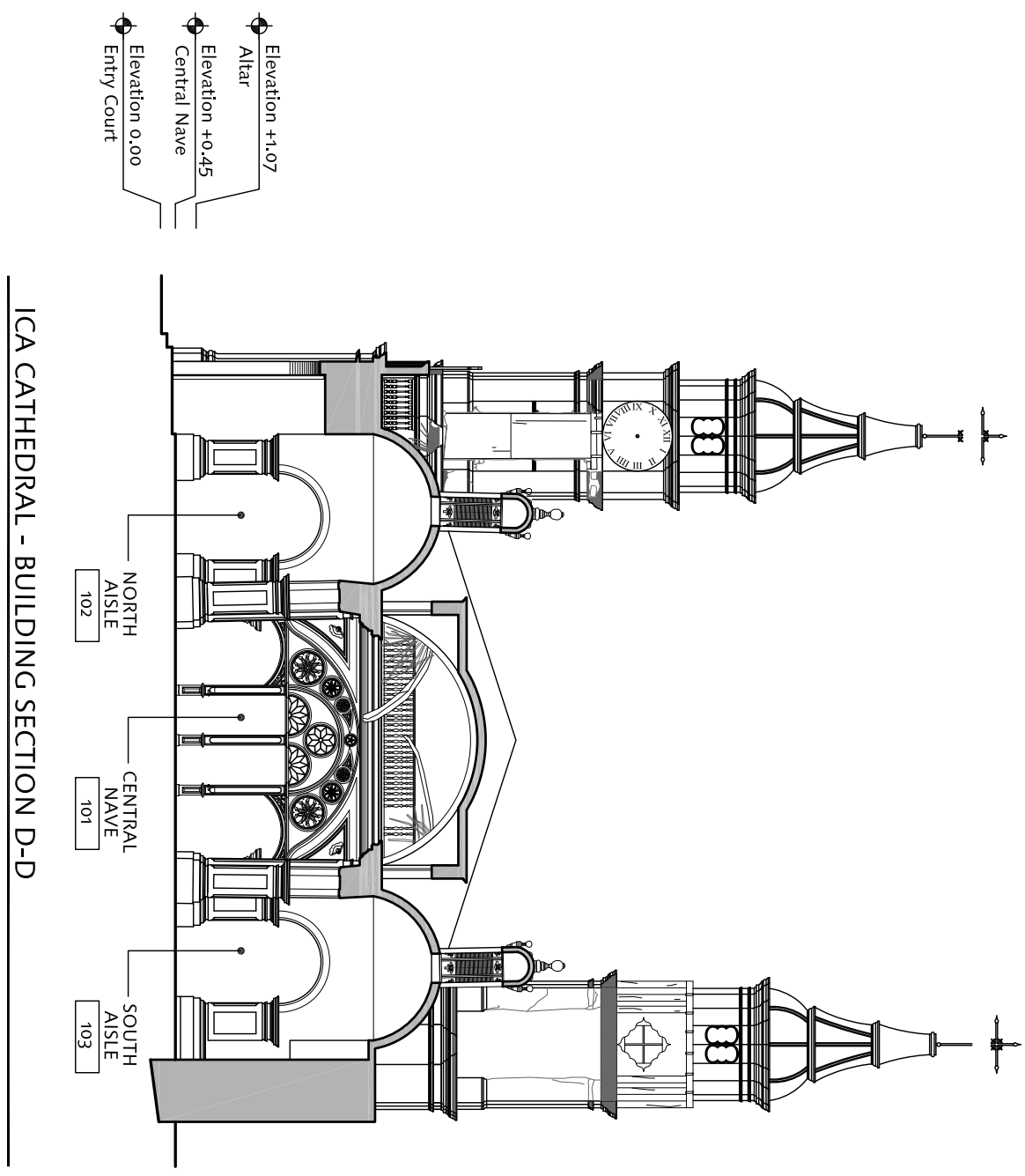
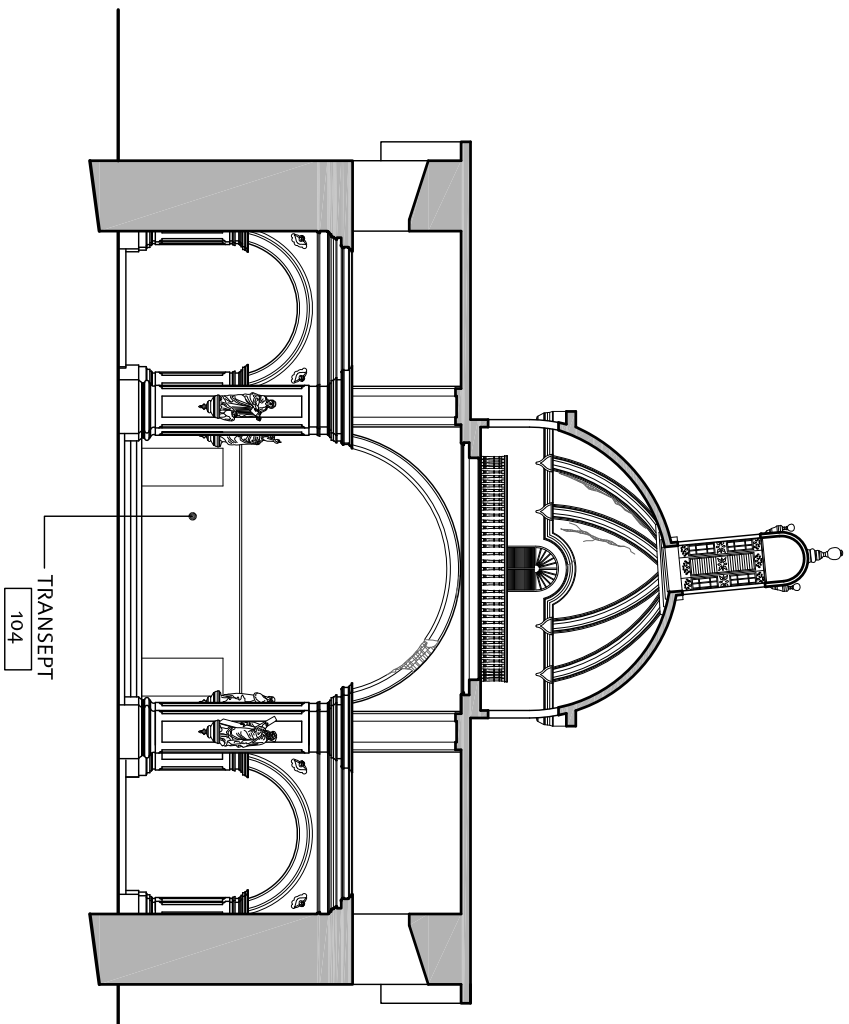
Pontificia Universidad Católica del Perú

Building: ICA CATHEDRAL, Ica, Perú		Base Drawing Prepared By: Arq. Mirna Soto Medina	Date: May 16, 2011
			Scale: 1:200
Sheet Title: Building Sections Existing Conditions		Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: IC-7
		Drawing Edited By: S. Lardinois and C. Cancino	



ICA CATHEDRAL - BUILDING SECTION D-D



ICA CATHEDRAL - BUILDING SECTION E-E

Scale: 1 : 200

5 0 5 M

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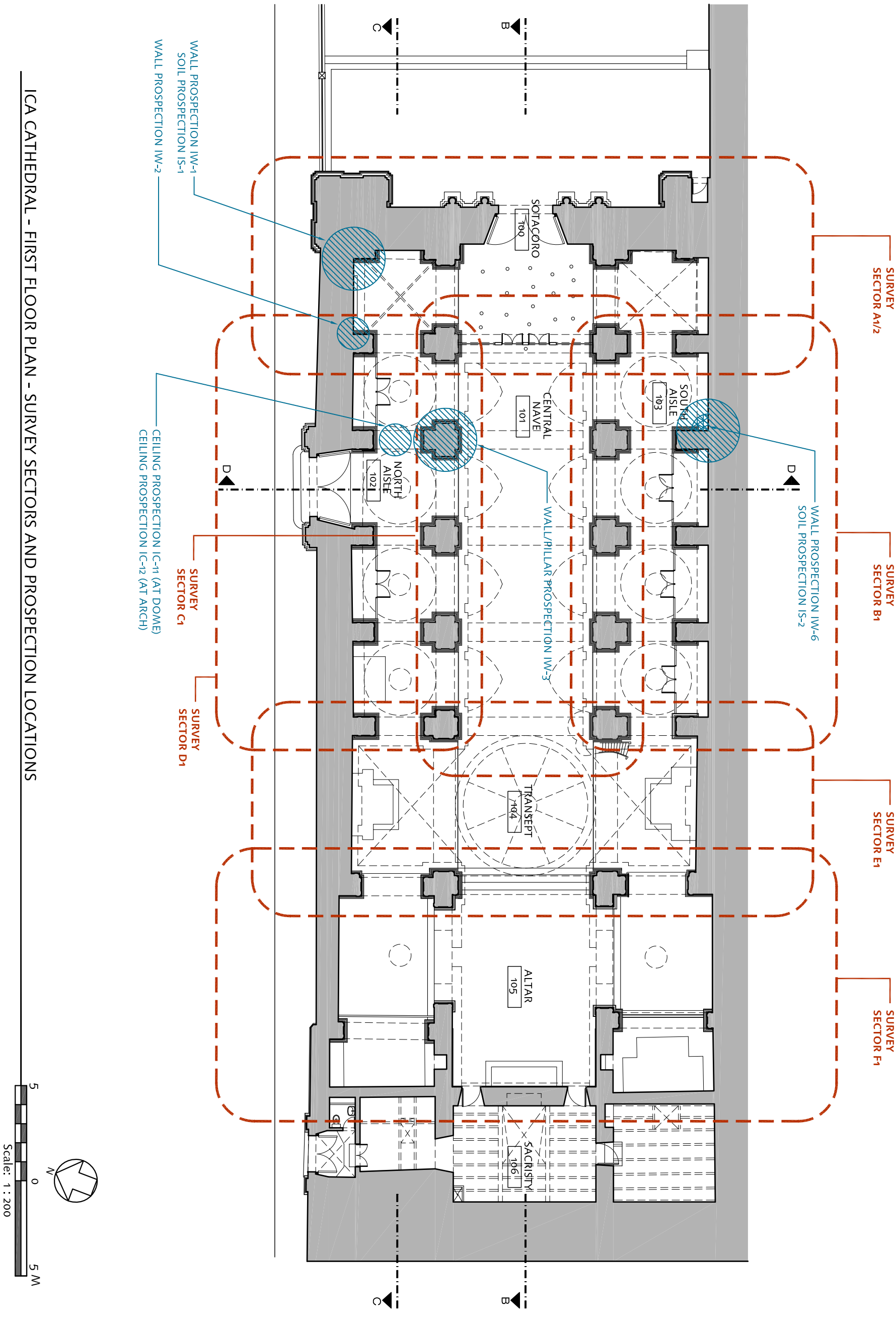
Pontificia Universidad Católica del Perú

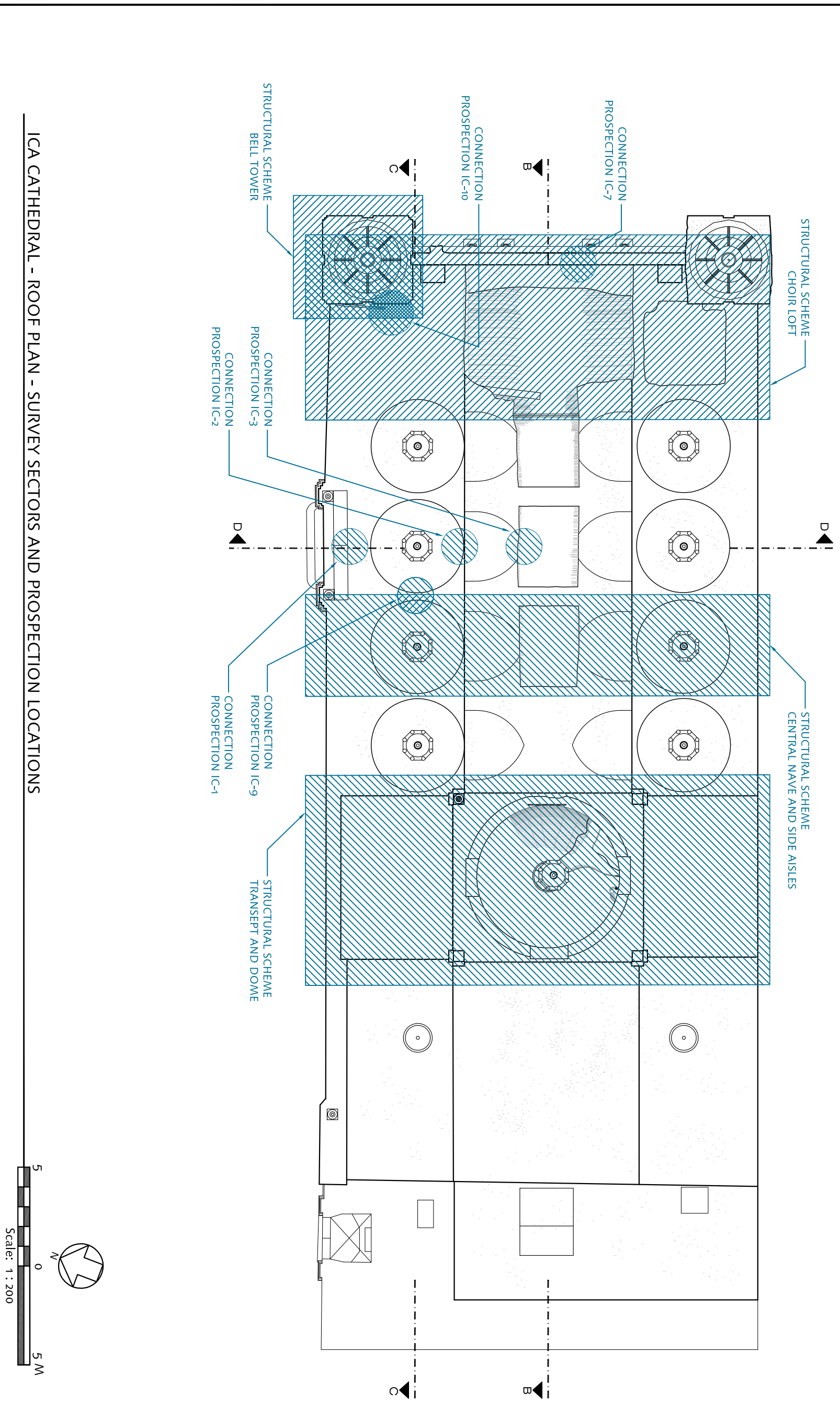
Building: ICA CATHEDRAL, Ica, Perú	Base Drawing Prepared By: Arq. Mirna Soto Medina	Date: May 16, 2011
		Scale: 1:200
Sheet Title: Building Sections, Existing Conditions	Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: IC-8
	Drawing Edited By: S. Lardinois and C. Cancino	

ICA CATHEDRAL - FIRST FLOOR PLAN - SURVEY SECTORS AND PROSPECTION LOCATIONS



SEISMIC RETROFITTING PROJECT The Earthen Architecture Initiative \\GETTY\.Athens_GCIFP.Getty\Field Projects\EAI\4_Retrofitting\4. Prototype sites\7_CAD Templates\Titleblock\SRP_EAI_All_Logos.jpg	Building: ICA CATHEDRAL Ica, Perú	Base Drawing Prepared By: Arq. Mirna Soto Medina	Date: May 16, 2011
			Scale: 1:200
	Sheet Title: First Floor Plan Survey Sectors and Prospection Locations	Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: IC-9
		Drawing Edited By: S. Lardinois and C. Cancino	

ICA CATHEDRAL - ROOF PLAN - SURVEY SECTORS AND PROSPECTION LOCATIONS



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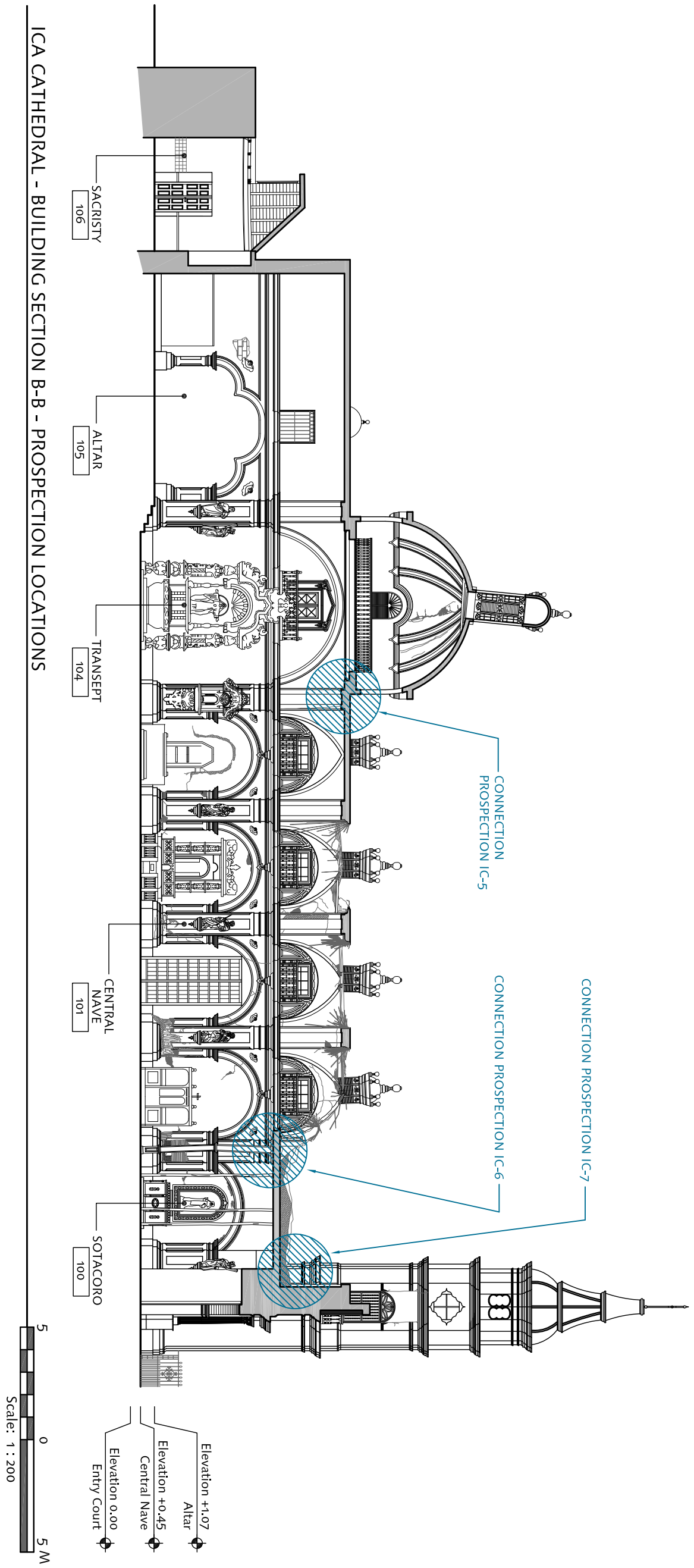
Building: ICA CATHEDRAL, Ica, Perú		Base Drawing Prepared By: Arq. Mirna Soto Medina	Date: May 16, 2011
			Scale: 1:200
Sheet Title: Roof Plan, Survey Sectors and Prospection Locations		Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: IC-10
		Drawing Edited By: S. Lardinois and C. Cancino	

ICA CATHEDRAL - BUILDING SECTION B-B - PROSPECTION LOCATIONS



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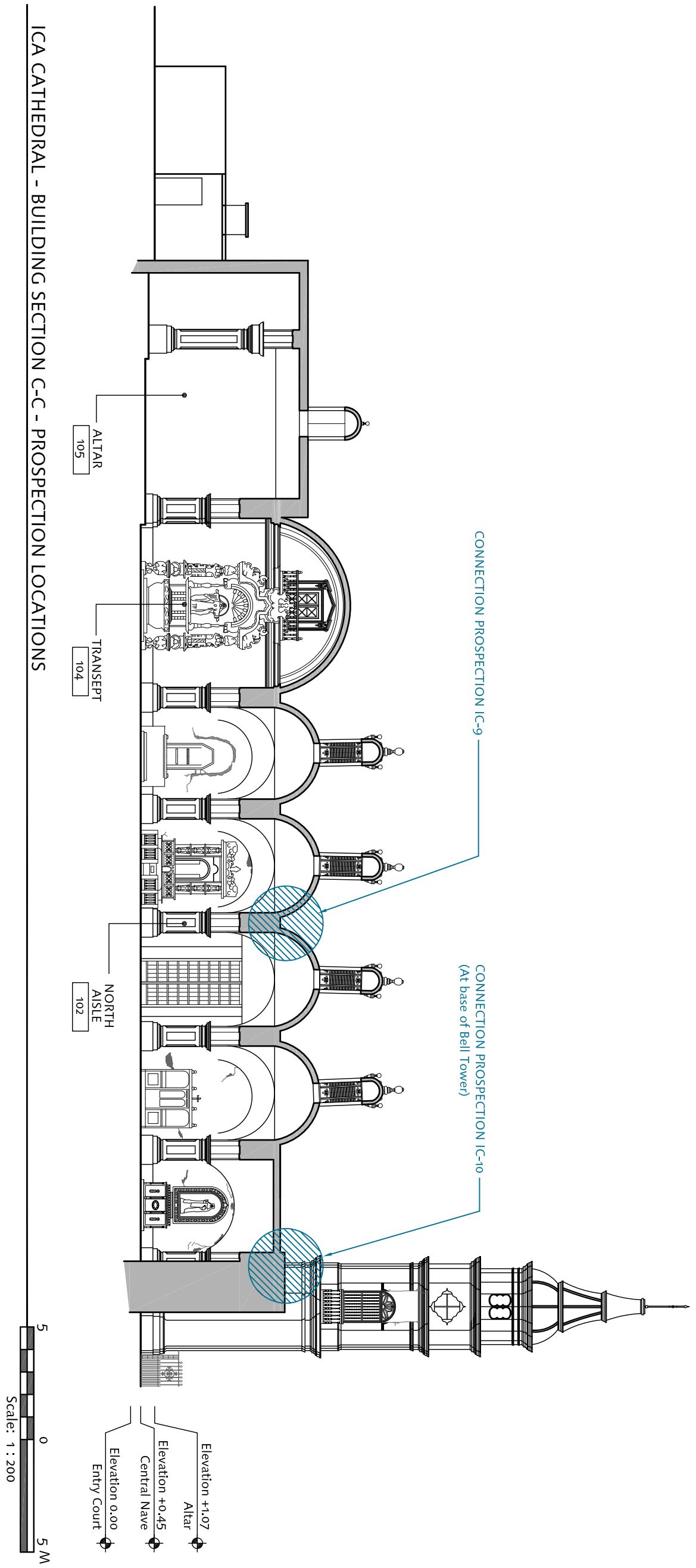
Building: ICA CATHEDRAL, Ica, Perú		Base Drawing Prepared By: Arq. Mirna Soto Medina	Date: May 16, 2011
			Scale: 1:200
Sheet Title: Building Sections Prospection Locations		Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: IC-11
		Drawing Edited By: S. Lardinois and C. Cancino	

ICA CATHEDRAL - BUILDING SECTION C-C - PROSPECTION LOCATIONS



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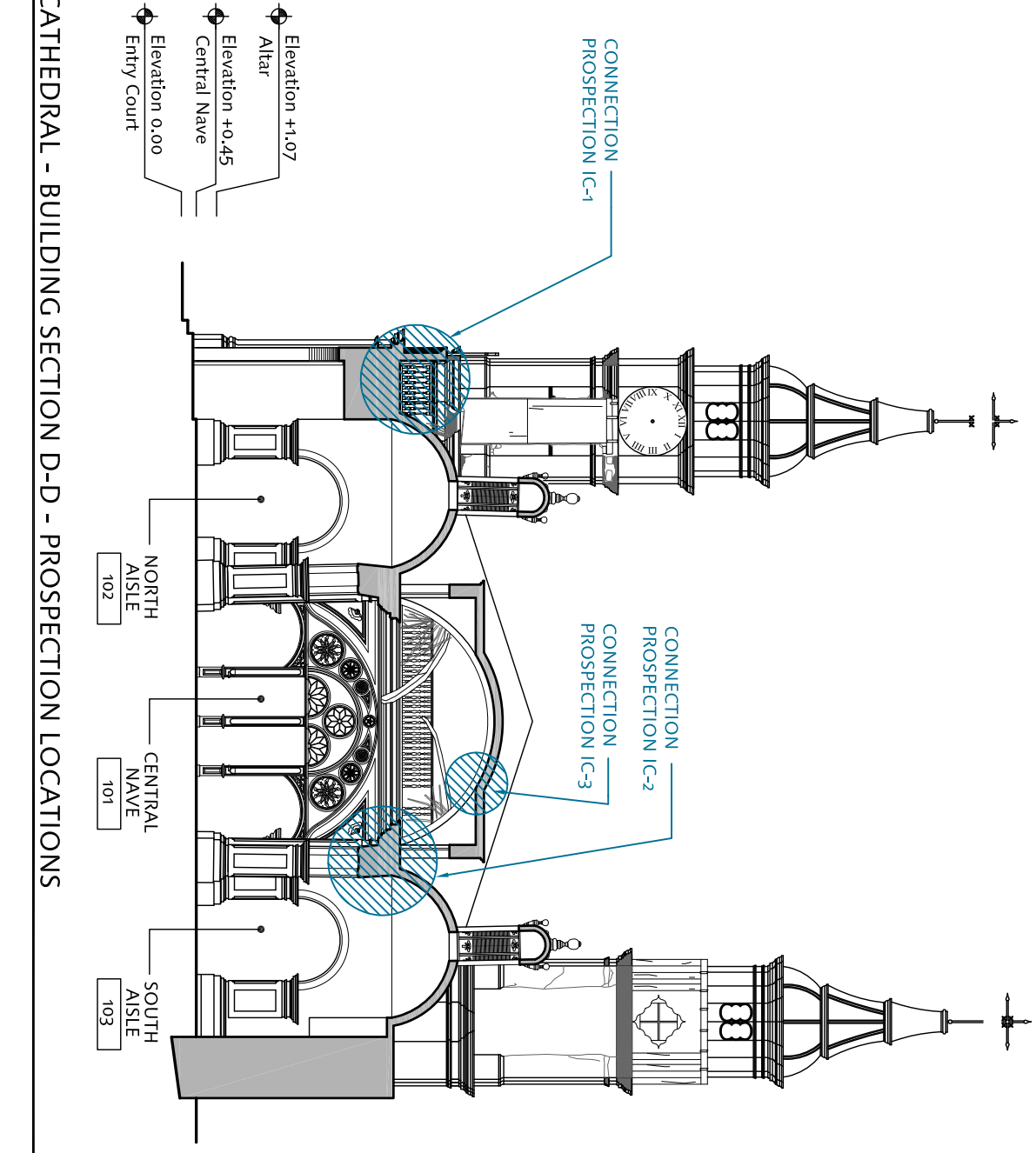
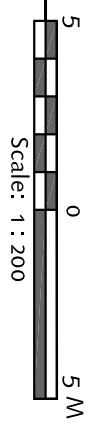
Building: ICA CATHEDRAL, Ica, Perú	Base Drawing Prepared By: Arq. Mirna Soto Medina	Date: May 16, 2011
		Scale: 1:200
Sheet Title: Building Sections, Prospection Locations	Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: IC-12
	Drawing Edited By: S. Lardinois and C. Cancino	

ICA CATHEDRAL - BUILDING SECTION D-D - PROSPECTION LOCATIONS





SEISMIC RETROFITTING PROJECT
The Earthen Architecture Initiative

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UNIVERSITY OF BATH
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
ICA CATHEDRAL
Ica, Perú

Sheet Title:
Building Sections
Prospection Locations

Base Drawing Prepared By:
Arq. Mirna Soto Medina

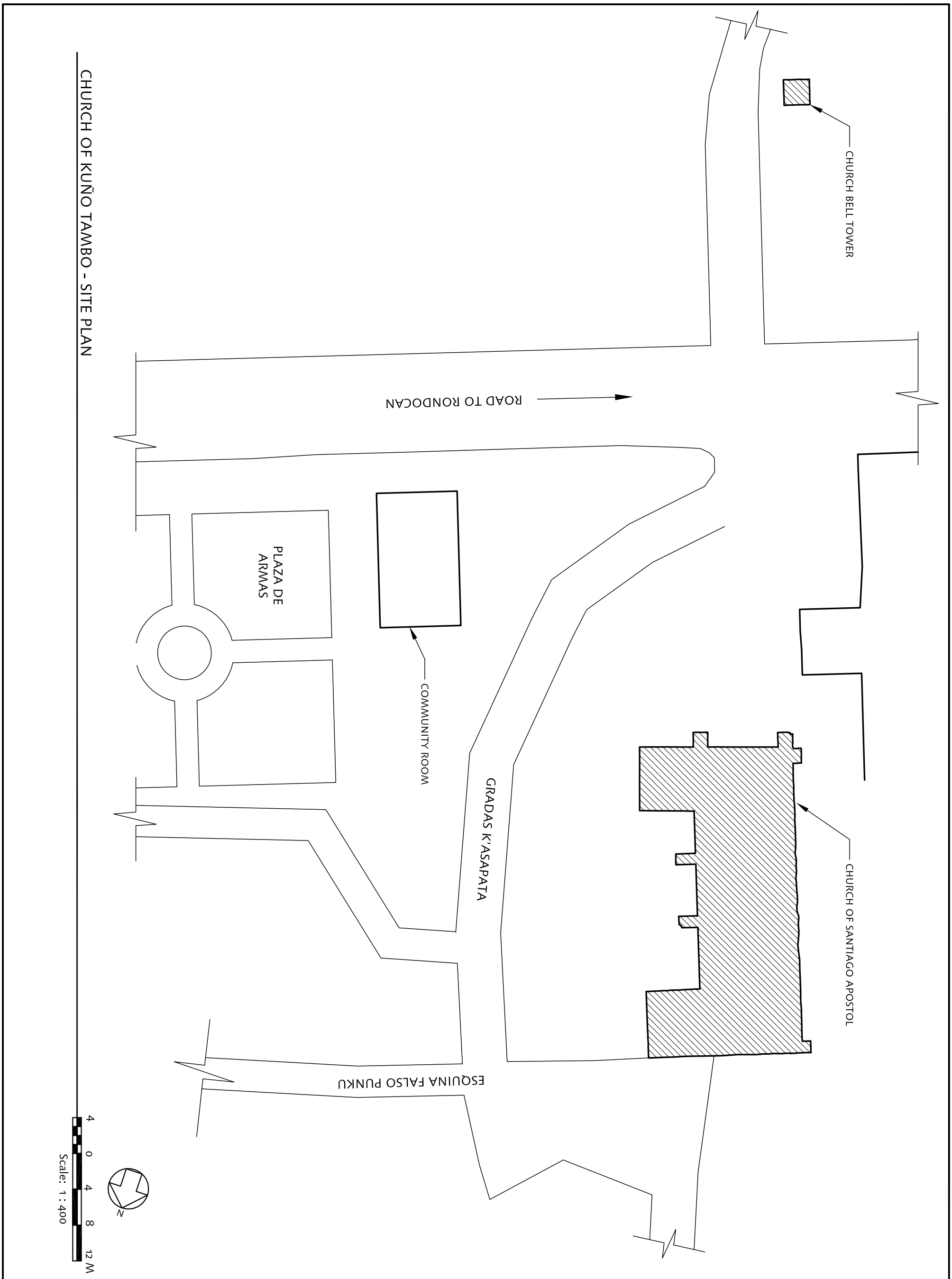
Survey Facilitator:
Universidad Católica Sedes Sapientiae

Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:200

Sheet No.:
IC-13



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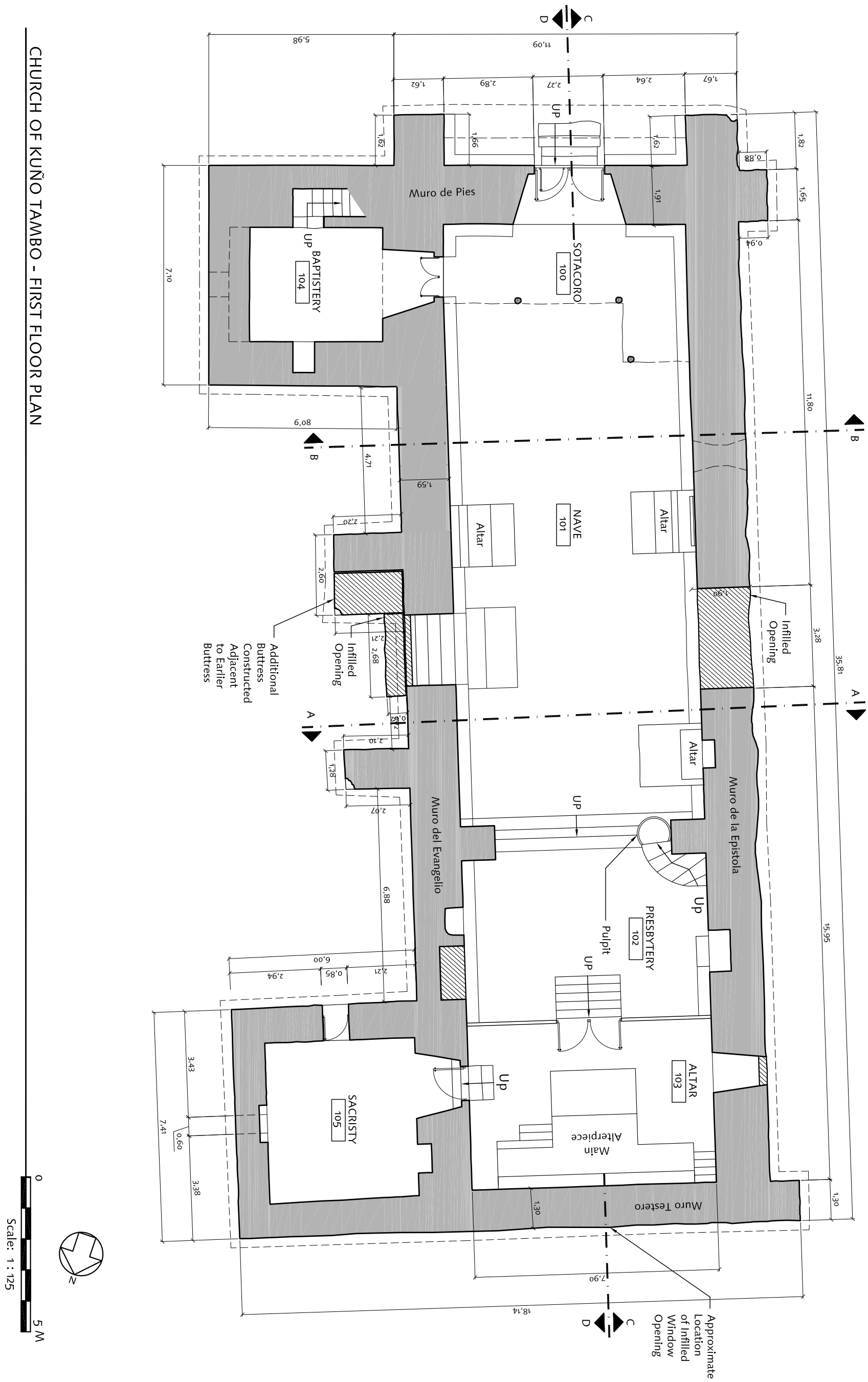
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building: CHURCH OF KUÑO TAMBO, Cusco, Perú		Base Drawing Prepared By: Arq. Ruben Estrada Tapra	Date: May 16, 2011
			Scale: 1:400
Sheet Title: Site Plan, Existing Conditions		Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: KT-1
		Drawing Edited By: S. Lardinois and C. Cancino	

CHURCH OF KUÑO TAMBO - FIRST FLOOR PLAN



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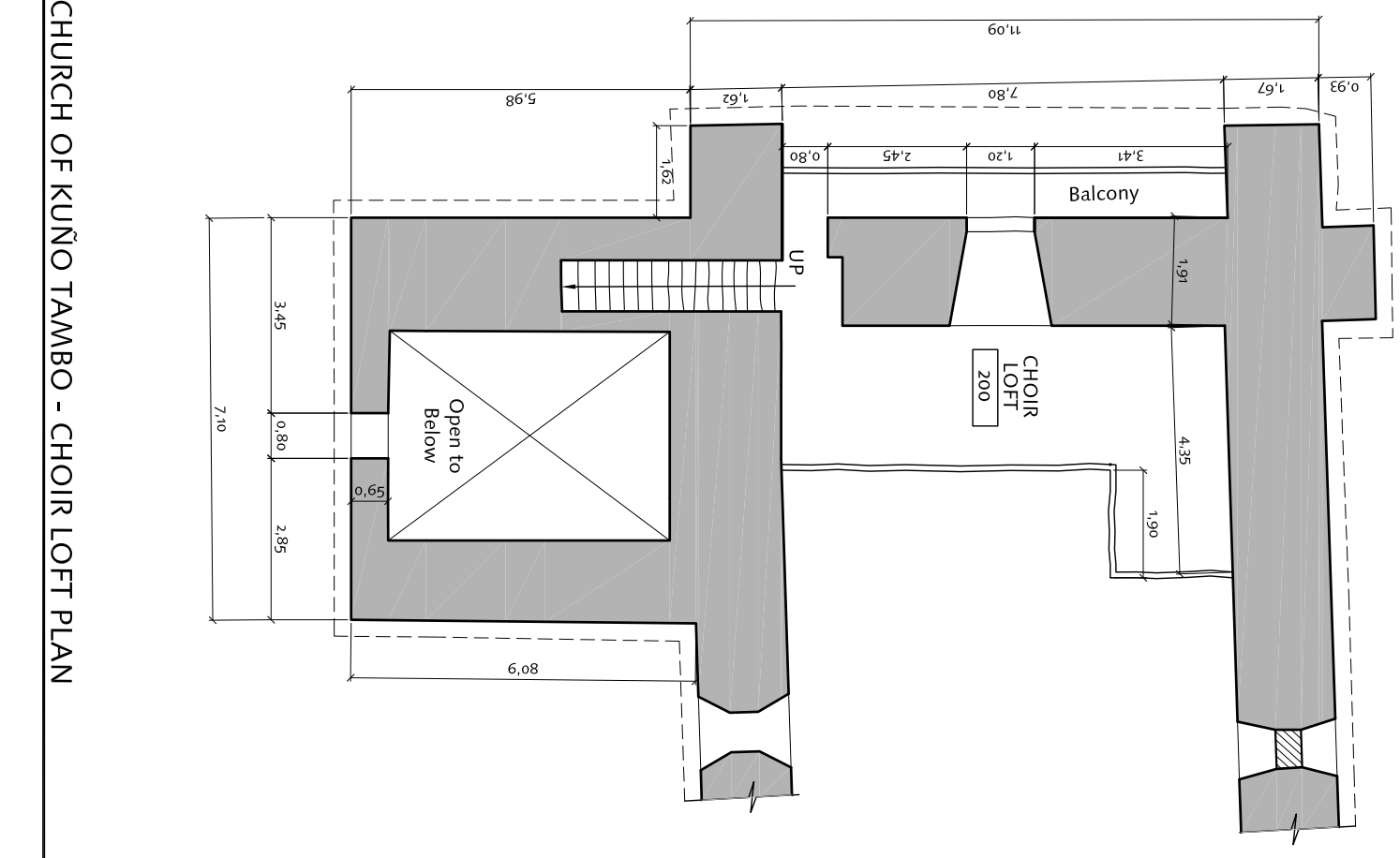
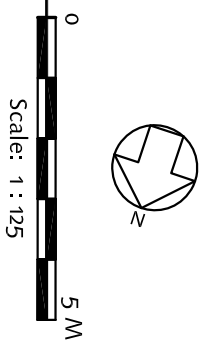
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building: CHURCH OF KUÑO TAMBO, Cusco, Perú	Base Drawing Prepared By: Arq. Ruben Estrada Tapra	Date: May 16, 2011
		Scale: 1:125
Sheet Title: First Floor Plan, Existing Conditions	Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: KT-2
	Drawing Edited By: S. Lardinois and C. Cancino	

CHURCH OF KUÑO TAMBO - CHOIR LOFT PLAN





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UNIVERSITY OF BATH

PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
CHURCH OF KUÑO TAMBO
Cusco, Perú

Sheet Title:
Choir Loft Plan
Existing Conditions

Base Drawing Prepared By:
Arq. Ruben Estrada Tapra

Survey Facilitator:
Universidad Católica Sedes Sapientiae

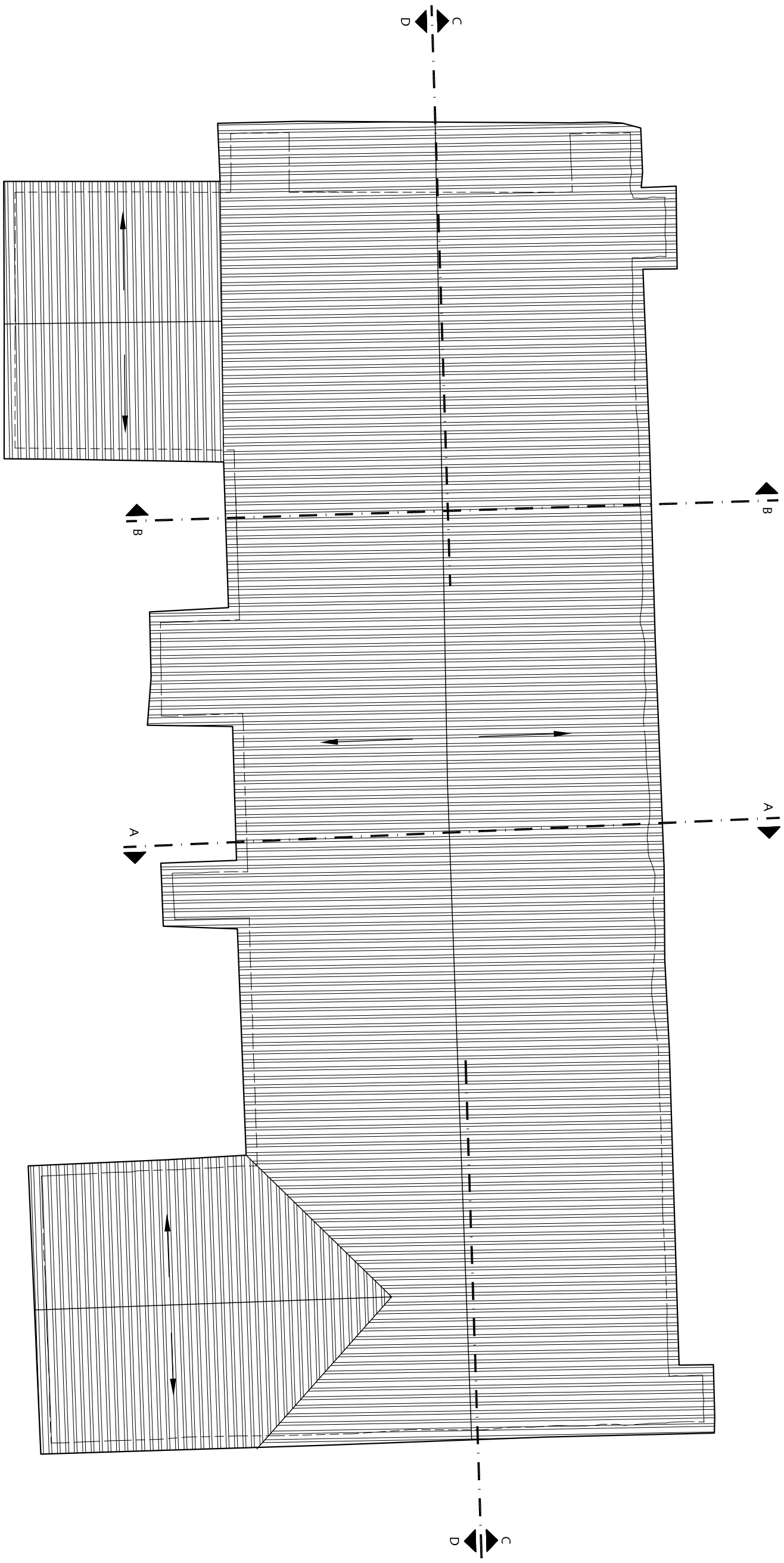
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:125

Sheet No.:
KT-3

CHURCH OF KUÑO TAMBO - ROOF PLAN



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Scale: 1 : 125
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SEISMIC RETROFITTING PROJECT
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UNIVERSITY OF BATH
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
CHURCH OF KUÑO TAMBO
Cusco, Perú

Sheet Title:
Roof Plan
Existing Conditions

Base Drawing Prepared By:
Arq. Ruben Estrada Tapra

Survey Facilitator:
Universidad Católica Sedes Sapientiae

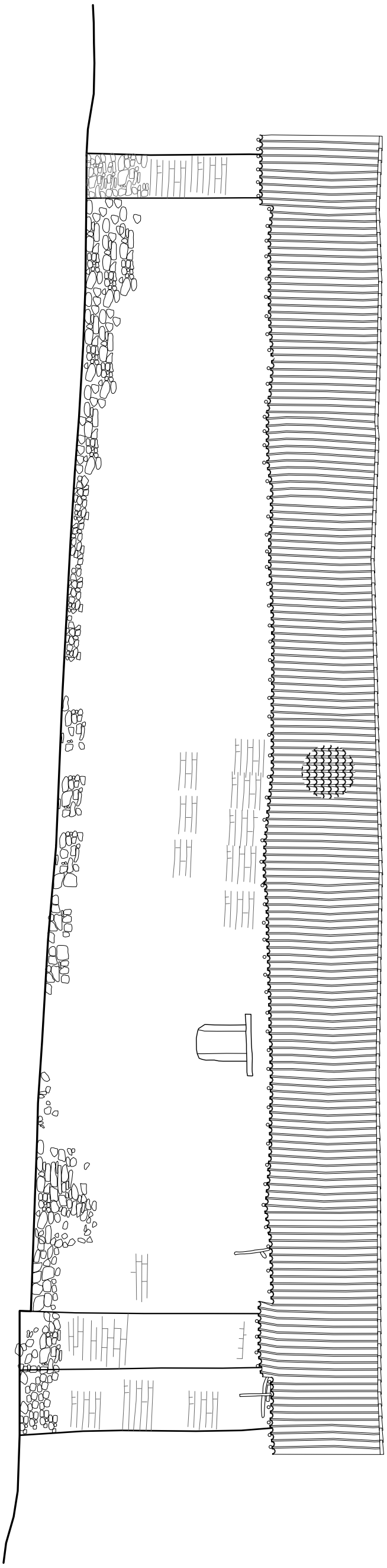
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

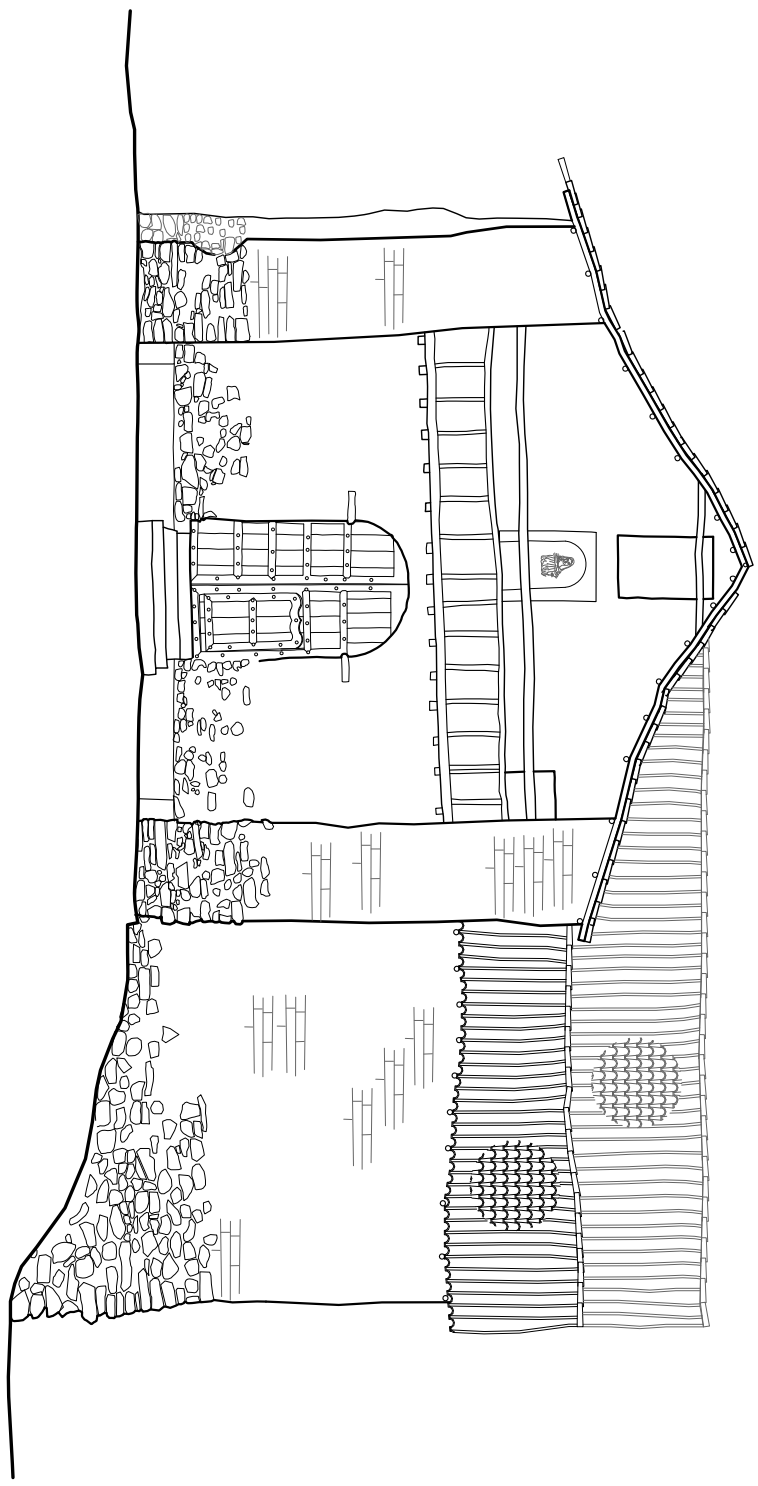
Scale:
1:125

Sheet No.:
KT-4

CHURCH OF KUÑO TAMBO - WEST ELEVATION



CHURCH OF KUÑO TAMBO - SOUTH ELEVATION



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UNIVERSITY OF BATH
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
CHURCH OF KUÑO TAMBO
Cusco, Perú

Sheet Title:
Exterior Elevations
Existing Conditions

Base Drawing Prepared By:
Arq. Ruben Estrada Tapra

Survey Facilitator:
Universidad Católica Sedes Sapientiae

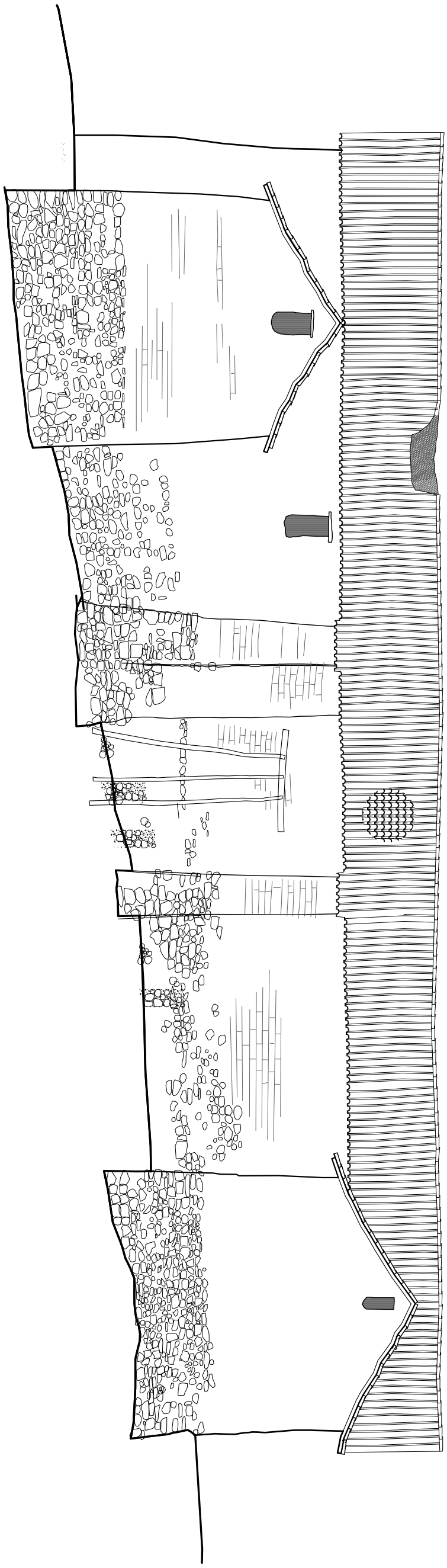
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

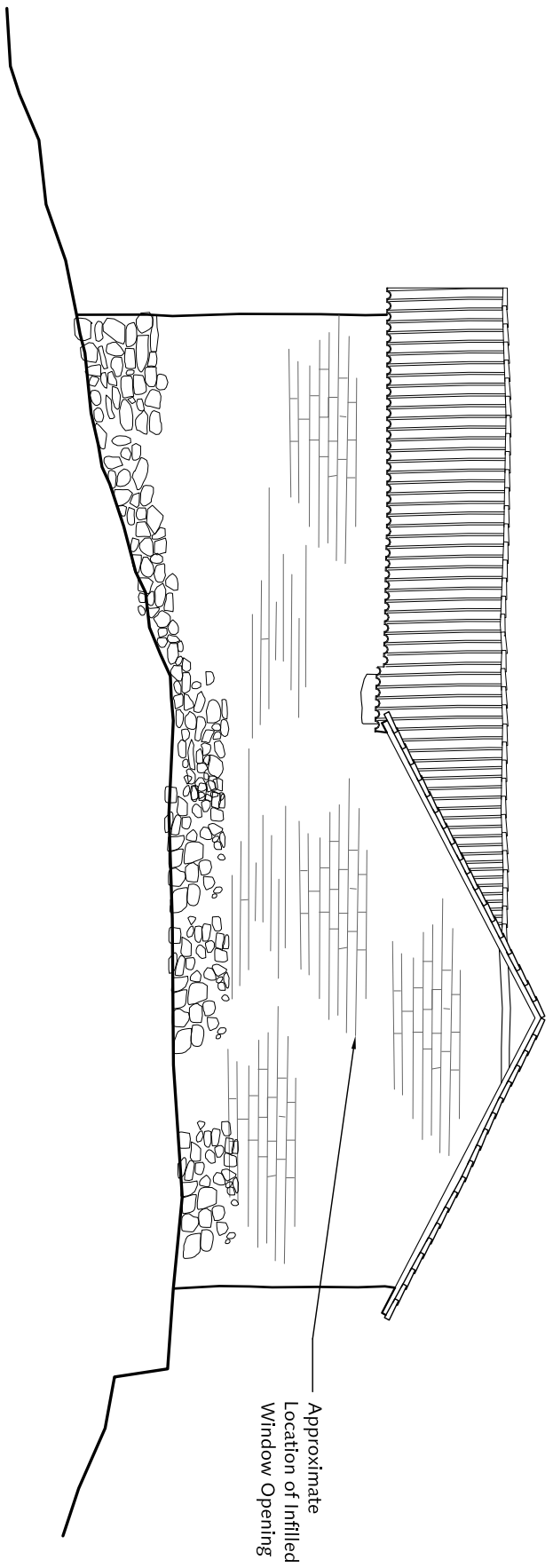
Scale:
1:125

Sheet No.:
KT-5

CHURCH OF KUÑO TAMBO - EAST ELEVATION



CHURCH OF KUÑO TAMBO - NORTH ELEVATION



SEISMIC RETROFITTING PROJECT
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The Getty Conservation Institute

UNIVERSITY OF BATH

PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
CHURCH OF KUÑO TAMBO
Cusco, Perú

Sheet Title:
Exterior Elevations
Existing Conditions

Base Drawing Prepared By:
Arq. Ruben Estrada Tapra

Survey Facilitator:
Universidad Católica Sedes Sapientiae

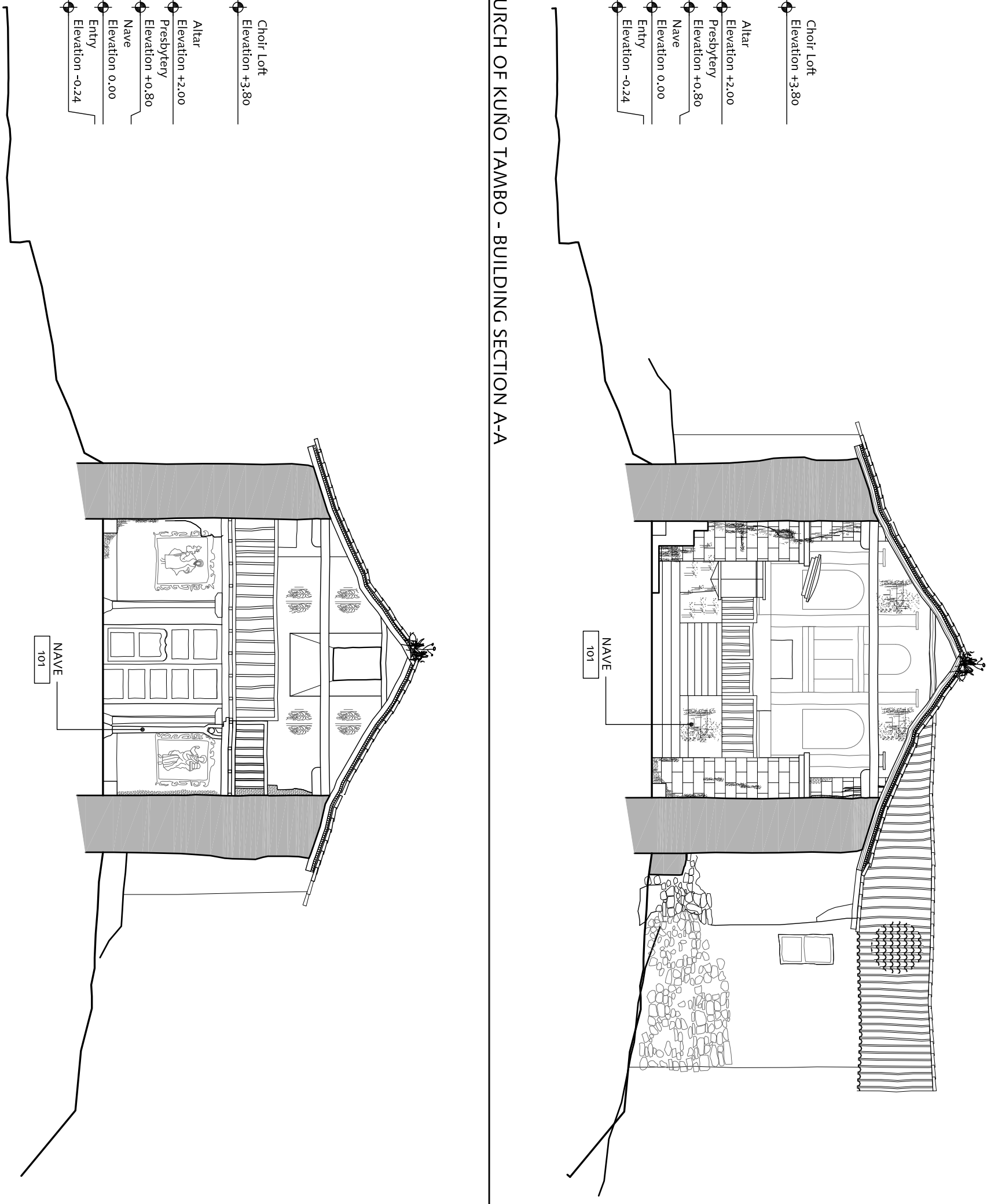
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:125

Sheet No.:
KT-6

CHURCH OF KUÑO TAMBO - BUILDING SECTION A-A



CHURCH OF KUÑO TAMBO - BUILDING SECTION B-B

Scale: 1 : 125

0 5 M

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The Earthen Architecture Initiative

The Getty Conservation Institute
UNIVERSITY OF BATH
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
CHURCH OF KUÑO TAMBO
Cusco, Perú

Sheet Title:
Building Sections
Existing Conditions

Base Drawing Prepared By:
Arq. Ruben Estrada Tapra

Survey Facilitator:
Universidad Católica Sedes Sapientiae

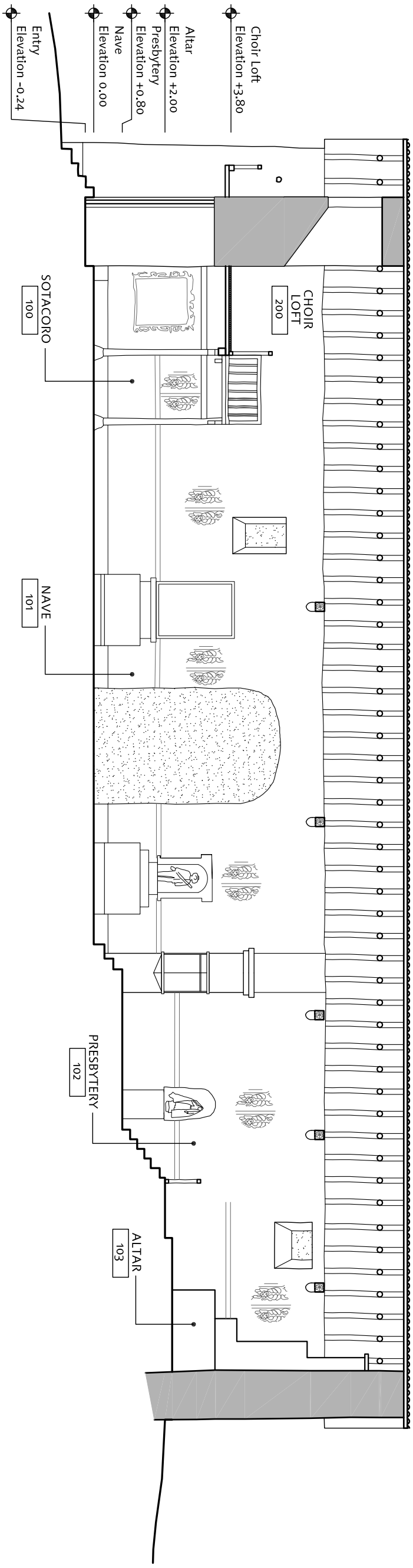
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

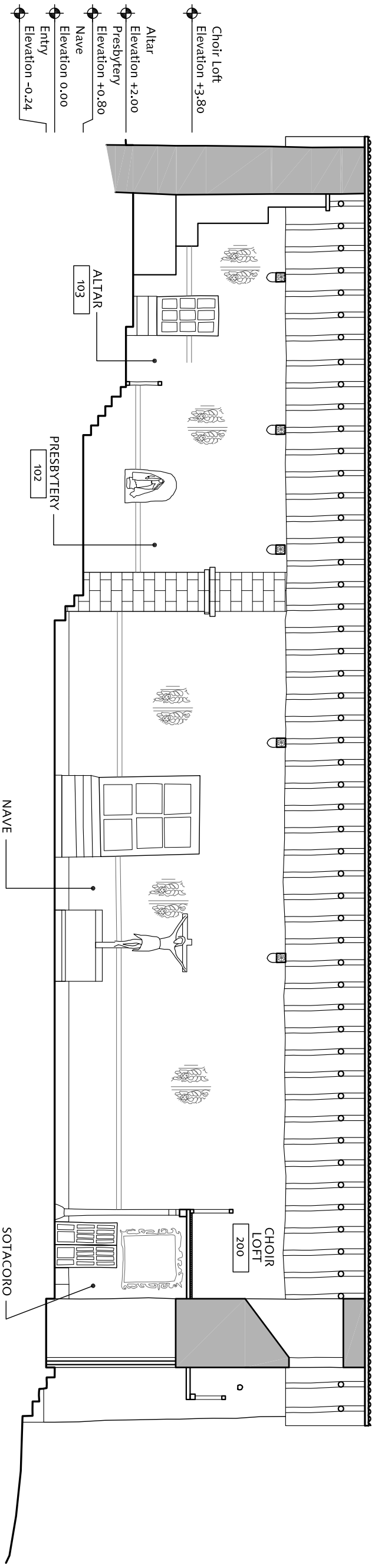
Scale:
1:125

Sheet No.:
KT-7

CHURCH OF KUÑO TAMBO - BUILDING SECTION C-C



CHURCH OF KUÑO TAMBO - BUILDING SECTION D-D



SEISMIC RETROFITTING PROJECT
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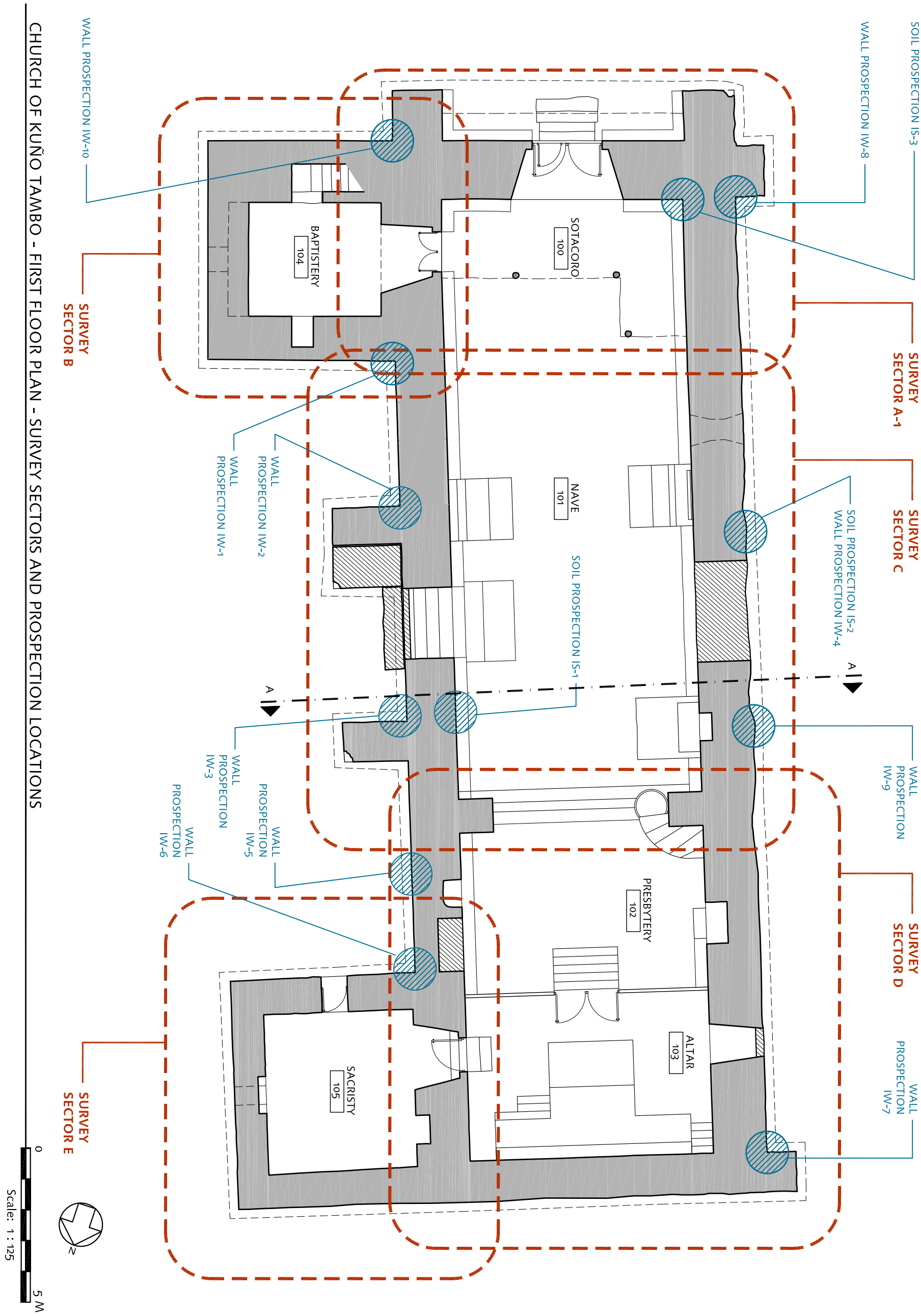
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building: CHURCH OF KUÑO TAMBO, Cusco, Perú	Base Drawing Prepared By: Arq. Ruben Estrada Tapra	Date: May 16, 2011
		Scale: 1:125
Sheet Title: Building Sections Existing Conditions	Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: KT-8
	Drawing Edited By: S. Lardinois and C. Cancino	

CHURCH OF KUÑO TAMBO - FIRST FLOOR PLAN - SURVEY SECTORS AND PROSPECTION LOCATIONS



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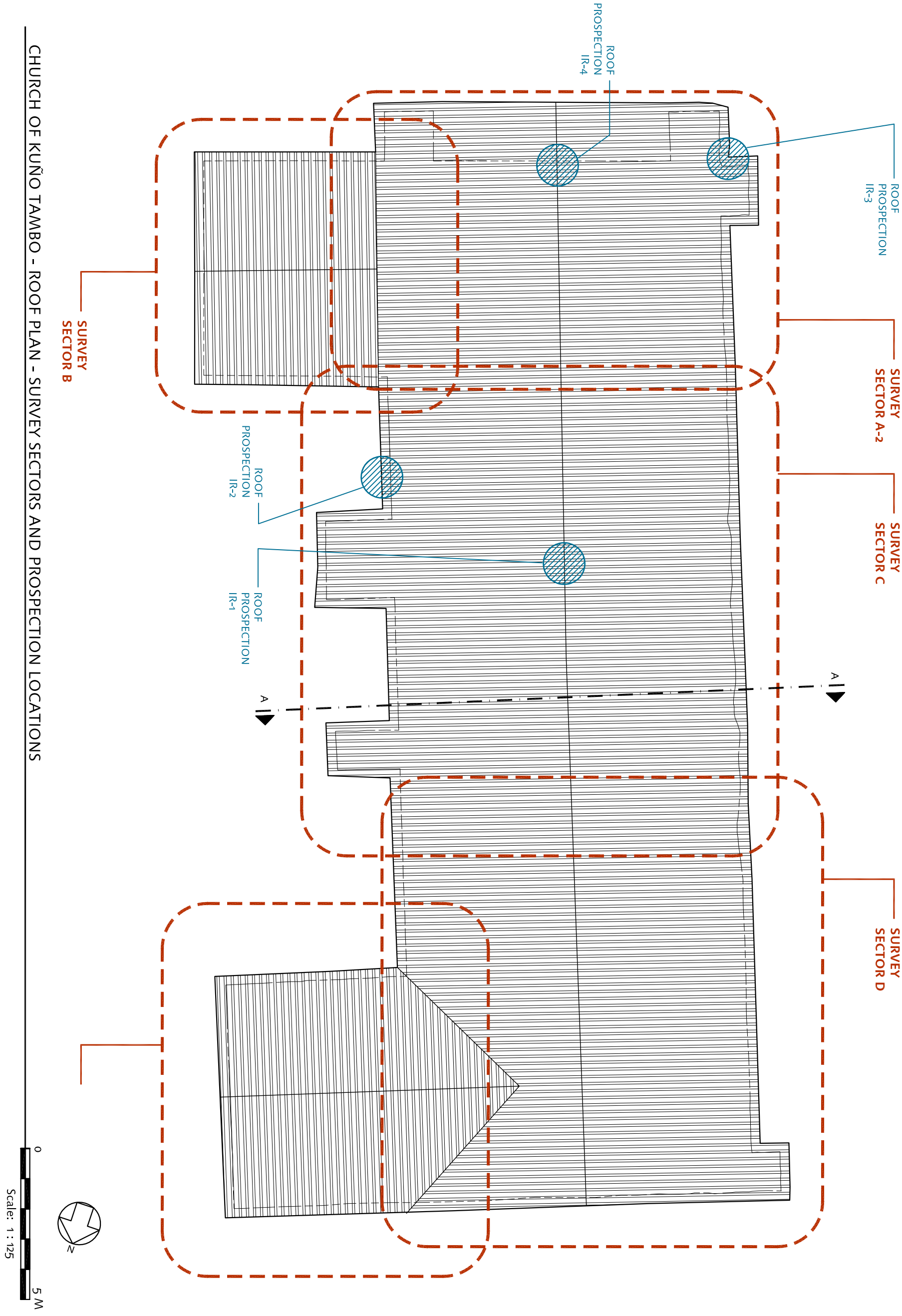
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building: CHURCH OF KUÑO TAMBO, Cusco, Perú		Base Drawing Prepared By: Arq. Ruben Estrada Tapra	Date: May 16, 2011
			Scale: 1:125
Sheet Title: First Floor Plan, Survey Sectors and Prospection Locations		Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: KT-9
		Drawing Edited By: S. Lardinois and C. Cancino	

CHURCH OF KUÑO TAMBO - ROOF PLAN - SURVEY SECTORS AND PROSPECTION LOCATIONS



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PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
CHURCH OF KUÑO TAMBO
Cusco, Perú

Sheet Title:
Roof Plan
Survey Sectors and
Prospection Locations

Base Drawing Prepared By:
Arq. Ruben Estrada Tapra

Survey Facilitator:
Universidad Católica Sedes Sapientiae

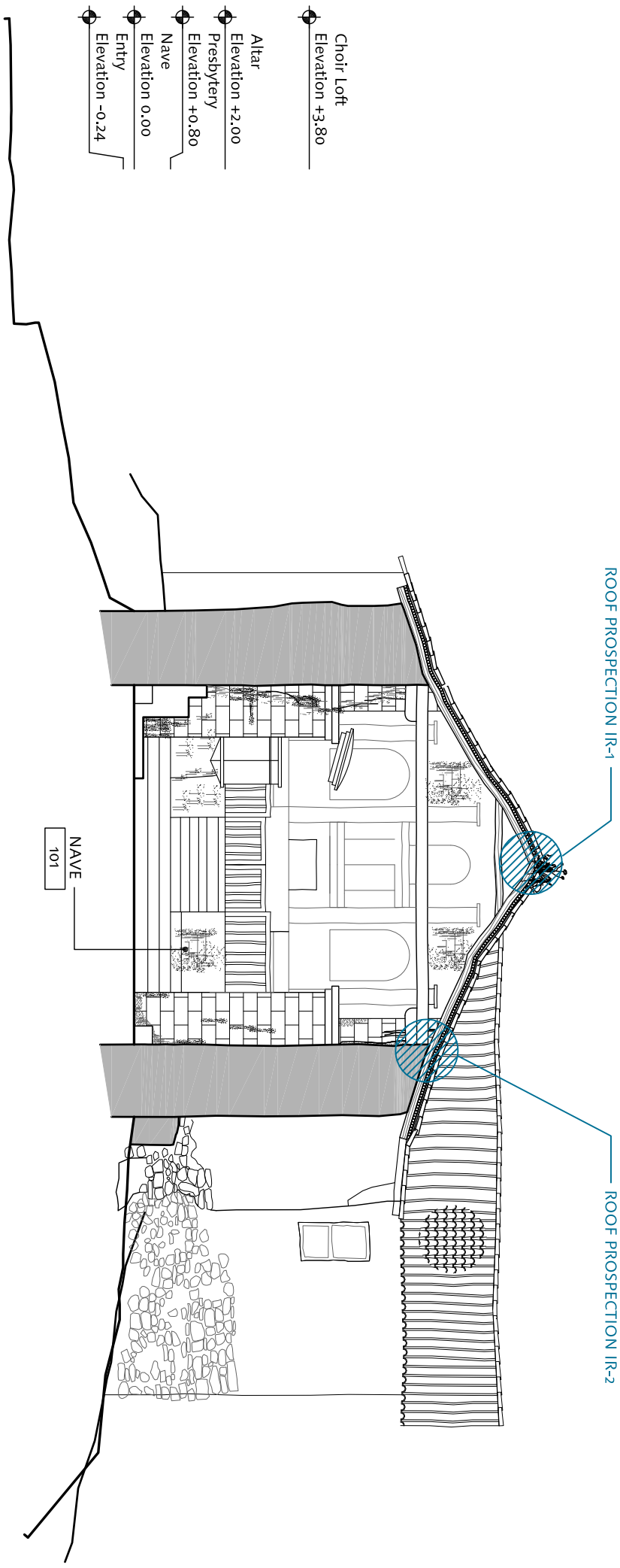
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:125

Sheet No.:
KT-10

CHURCH OF KUÑO TAMBO - BUILDING SECTION A-A - PROSPECTION LOCATIONS



Scale: 1 : 125

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PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
CHURCH OF KUÑO TAMBO
Cusco, Perú

Sheet Title:
Building Sections
Prospction Locations

Base Drawing Prepared By:
Arq. Ruben Estrada Tapra

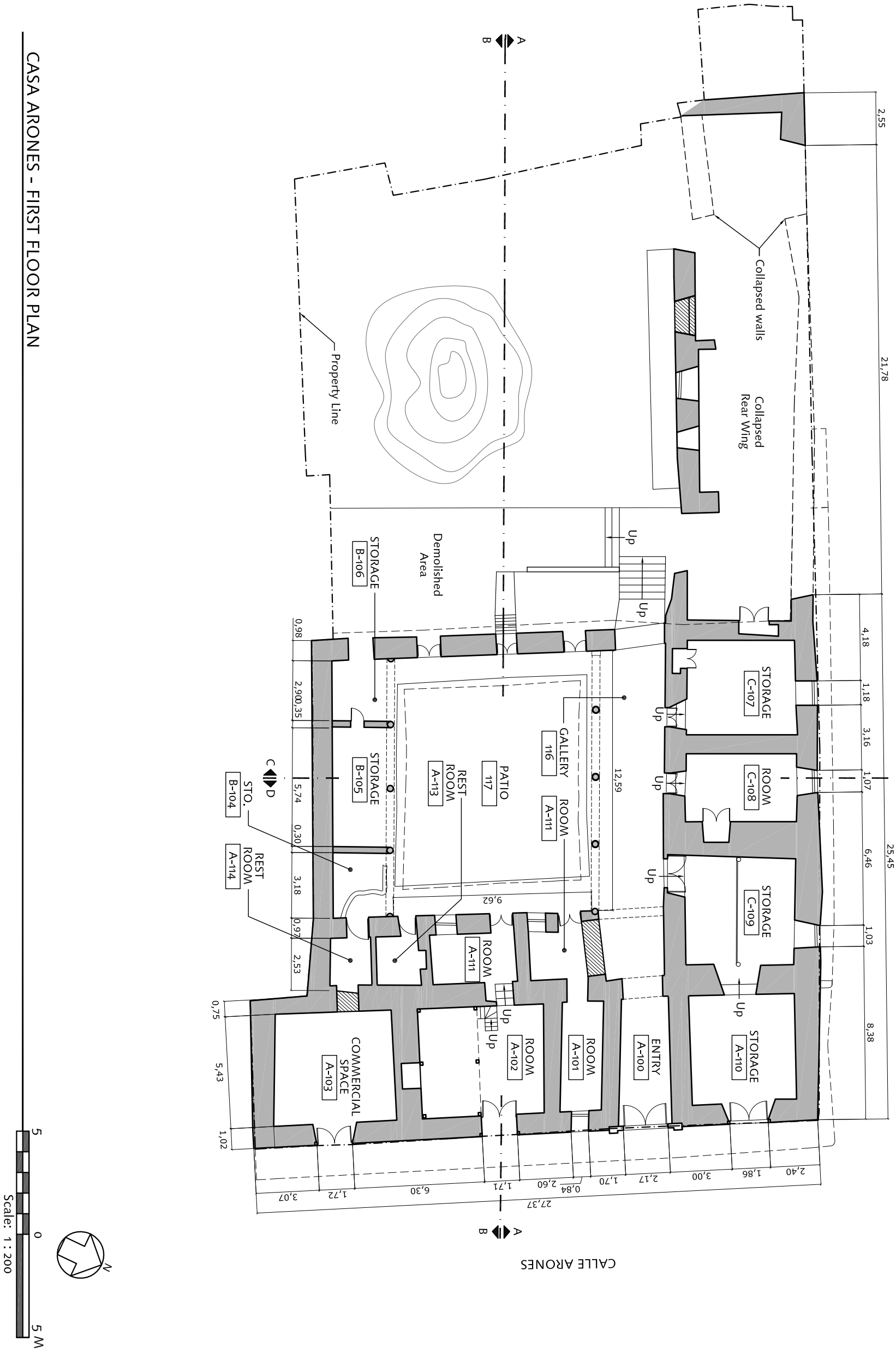
Survey Facilitator:
Universidad Católica Sedes Sapientiae

Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:125

Sheet No.:
KT-11



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PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
CASA ARONES
Cusco, Perú

Sheet Title:
First Floor Plan
Existing Conditions

Base Drawing Prepared By:
Arq. Enrique Estrada
Arqtas. Yise La Ochoa Lind, Veronica Villagarcia, and Sofia Valenza L.

Survey Facilitator:
Universidad Católica Sedes Sapientiae

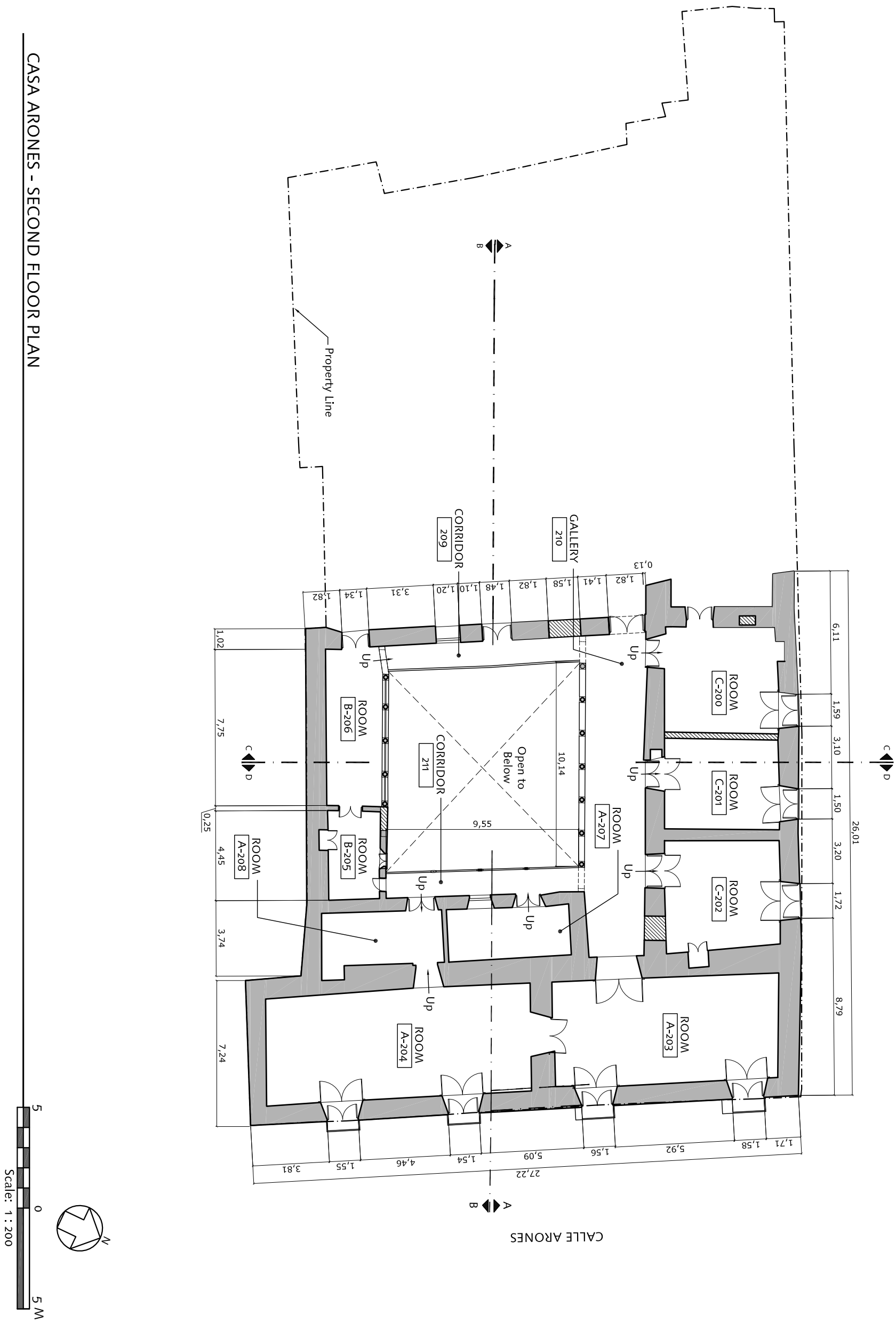
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:200

Sheet No.:
CA-1

CASA ARONES - SECOND FLOOR PLAN



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PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
CASA ARONES
Cusco, Perú

Sheet Title:
Second Floor Plan
Existing Conditions

Base Drawing Prepared By:
Arq. Enrique Estrada
Arqtas. Yise La Ochoa Lind, Veronica Villagarcia, and Sofia Valenza L.

Survey Facilitator:
Universidad Católica Sedes Sapientiae

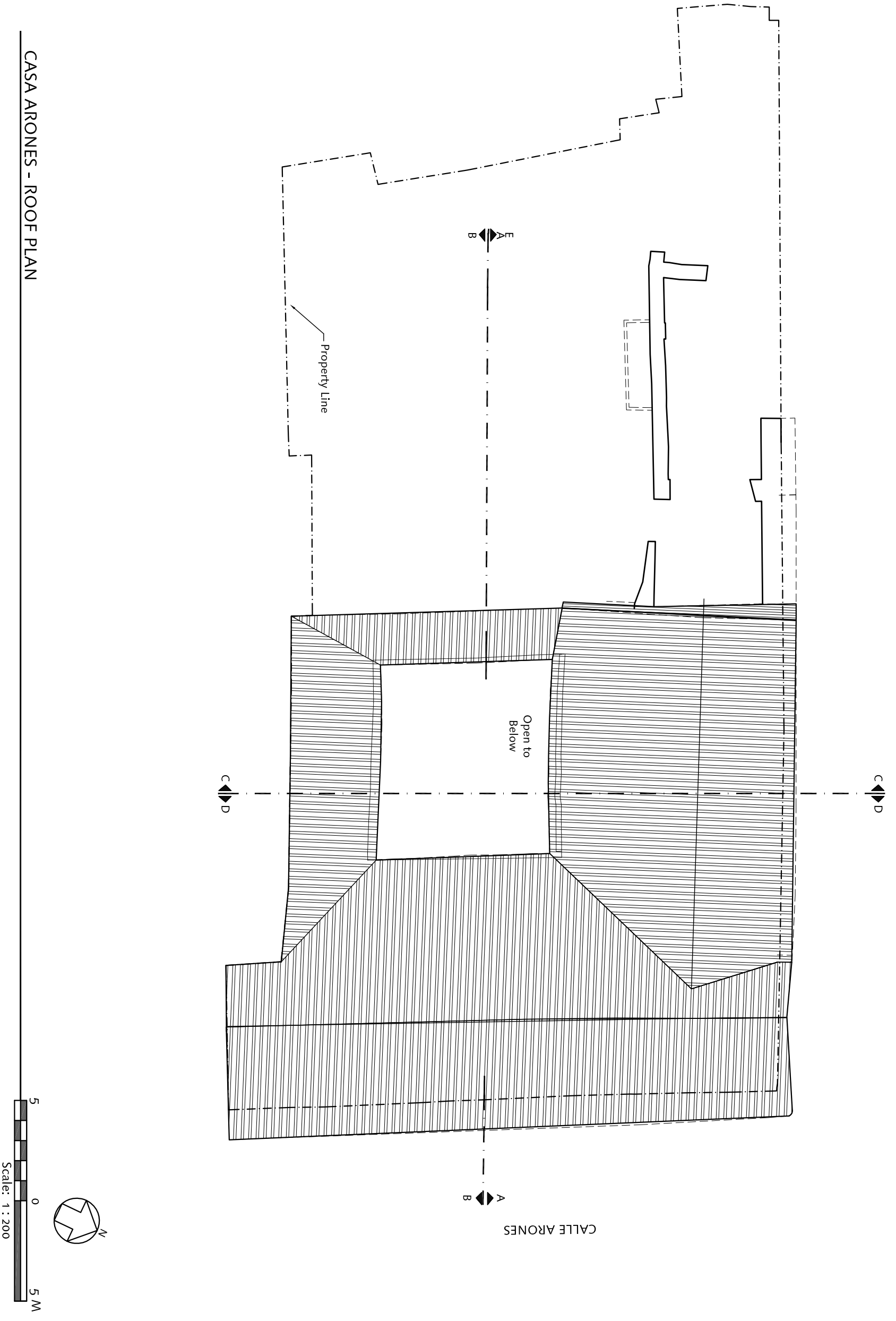
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:200

Sheet No.:
CA-2

CASA ARONES - ROOF PLAN



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PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
CASA ARONES
Cusco, Perú

Sheet Title:
Roof Plan
Existing Conditions

Base Drawing Prepared By:
Arq. Enrique Estrada
Arqtas. Yise La Ochoa Lind, Veronica Villagarcia, and Sofia Valenza L.

Survey Facilitator:
Universidad Católica Sedes Sapientiae

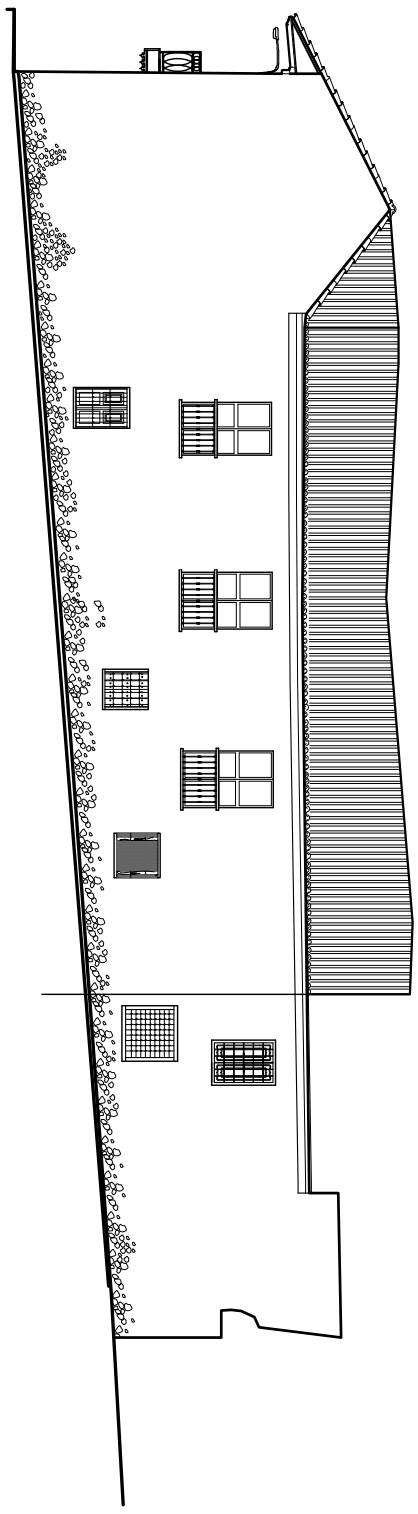
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

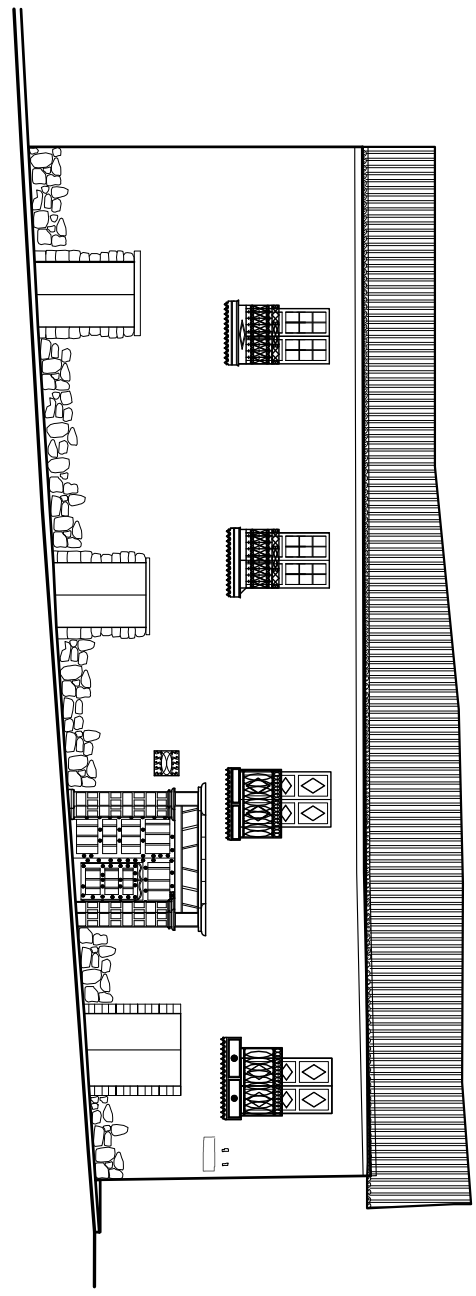
Scale:
1:200

Sheet No.:
CA-3

CASA ARONES - NORTHWEST ELEVATION (CALLE NUEVA ALTA)



CASA ARONES - NORTHEAST ELEVATION (CALLE ARONES)



Scale: 1 : 200

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PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
CASA ARONES
Cusco, Perú

Sheet Title:
Exterior Elevations
Existing Conditions

Base Drawing Prepared By:
Arq. Enrique Estrada
Arqtas. Yise La Ochoa Lind, Veronica Villagarcia, and Sofia Valenza L.

Survey Facilitator:
Universidad Católica Sedes Sapientiae

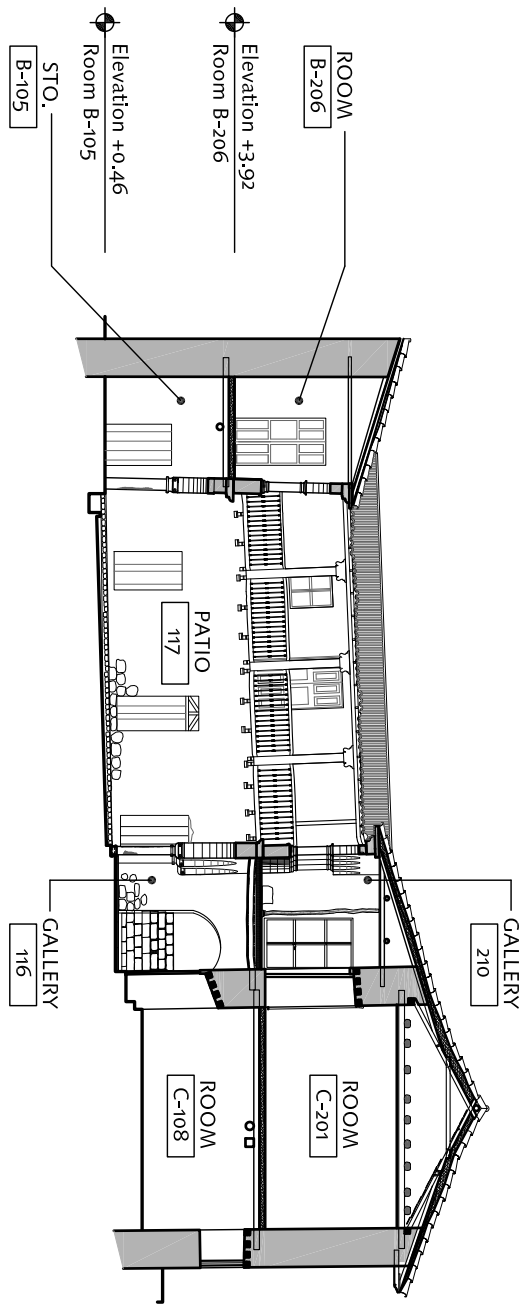
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

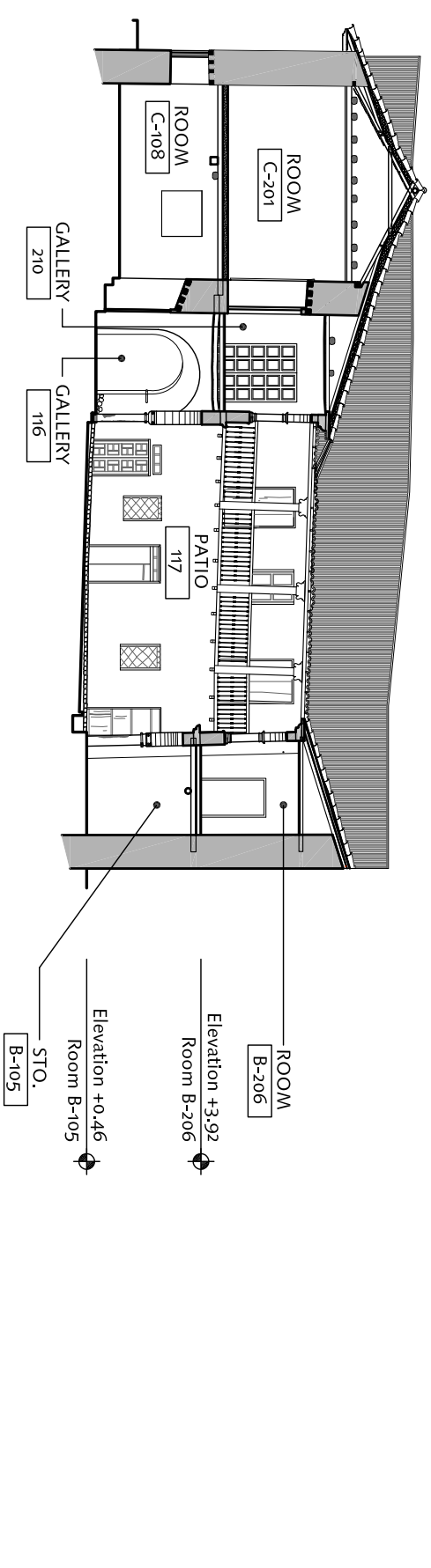
Scale:
1:200

Sheet No.:
CA-4

CASA ARONES - BUILDING SECTION A-A



CASA ARONES - BUILDING SECTION B-B



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Building:
CASA ARONES
Cusco, Perú

Sheet Title:
Building Sections
Existing Conditions

Base Drawing Prepared By:
Arq. Enrique Estrada
Arqtas. Yise La Ochoa Lind, Veronica Villagarcia, and Sofia Valenza L.

Survey Facilitator:
Universidad Católica Sedes Sapientiae

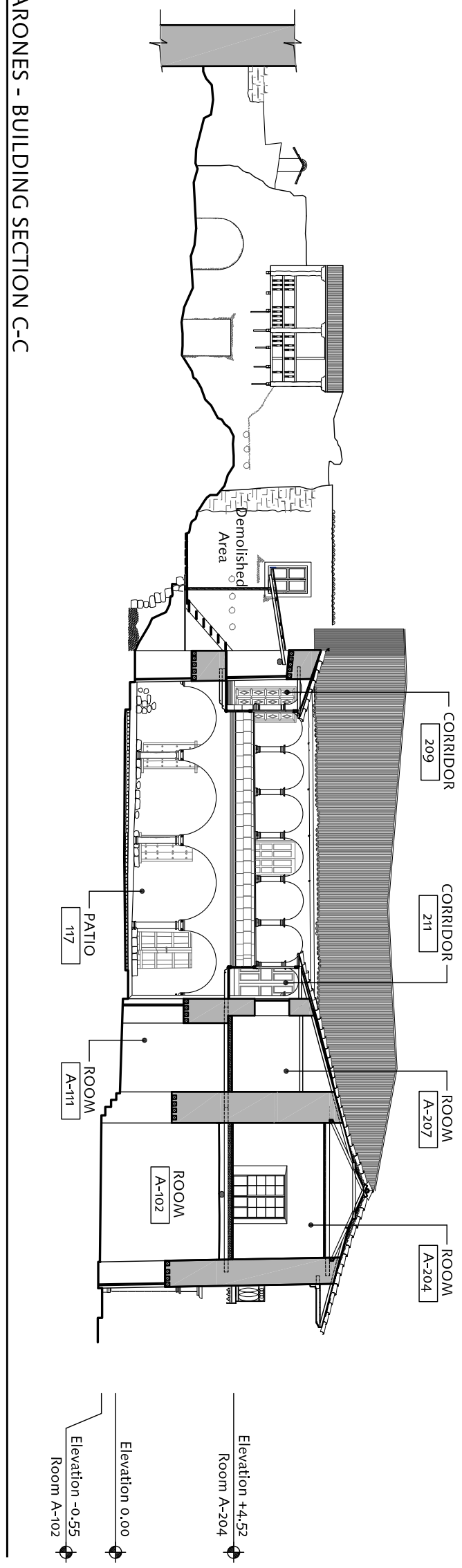
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

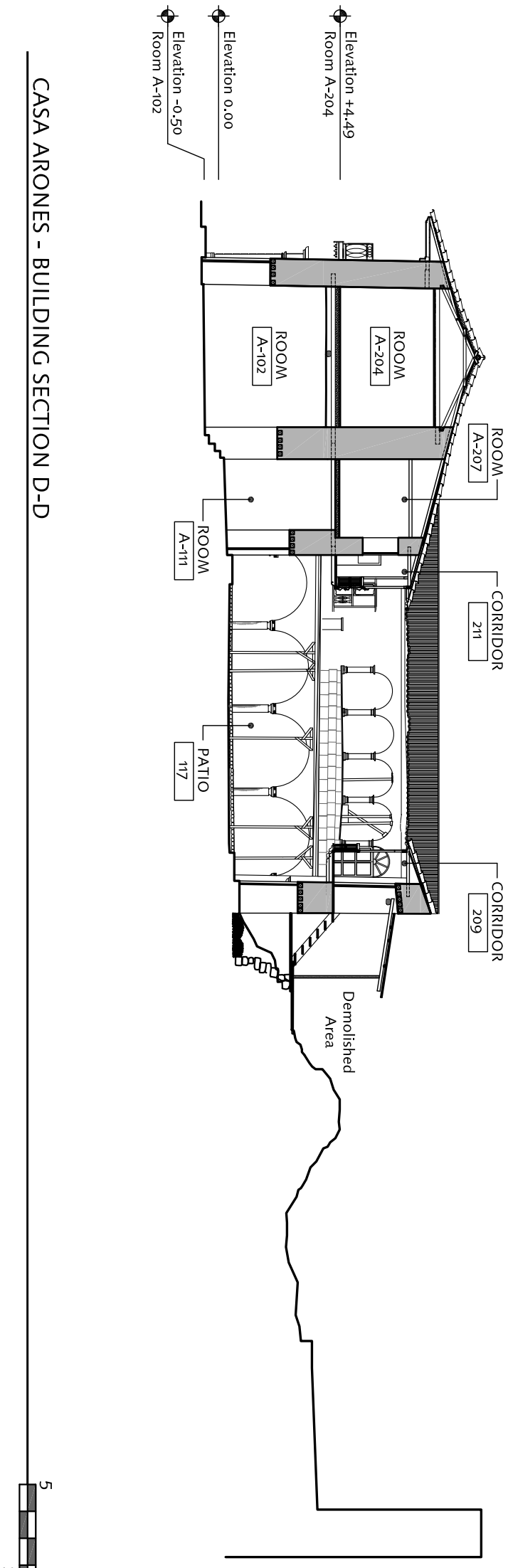
Scale:
1:200

Sheet No.:
CA-5

CASA ARONES - BUILDING SECTION C-C



CASA ARONES - BUILDING SECTION D-D



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PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
CASA ARONES
Cusco, Perú

Sheet Title:
Building Sections
Existing Conditions

Base Drawing Prepared By:
Arq. Enrique Estrada
Arqtas. Yise La Ochoa Lind, Veronica Villagarcia, and Sofia Valenza L.

Survey Facilitator:
Universidad Católica Sedes Sapientiae

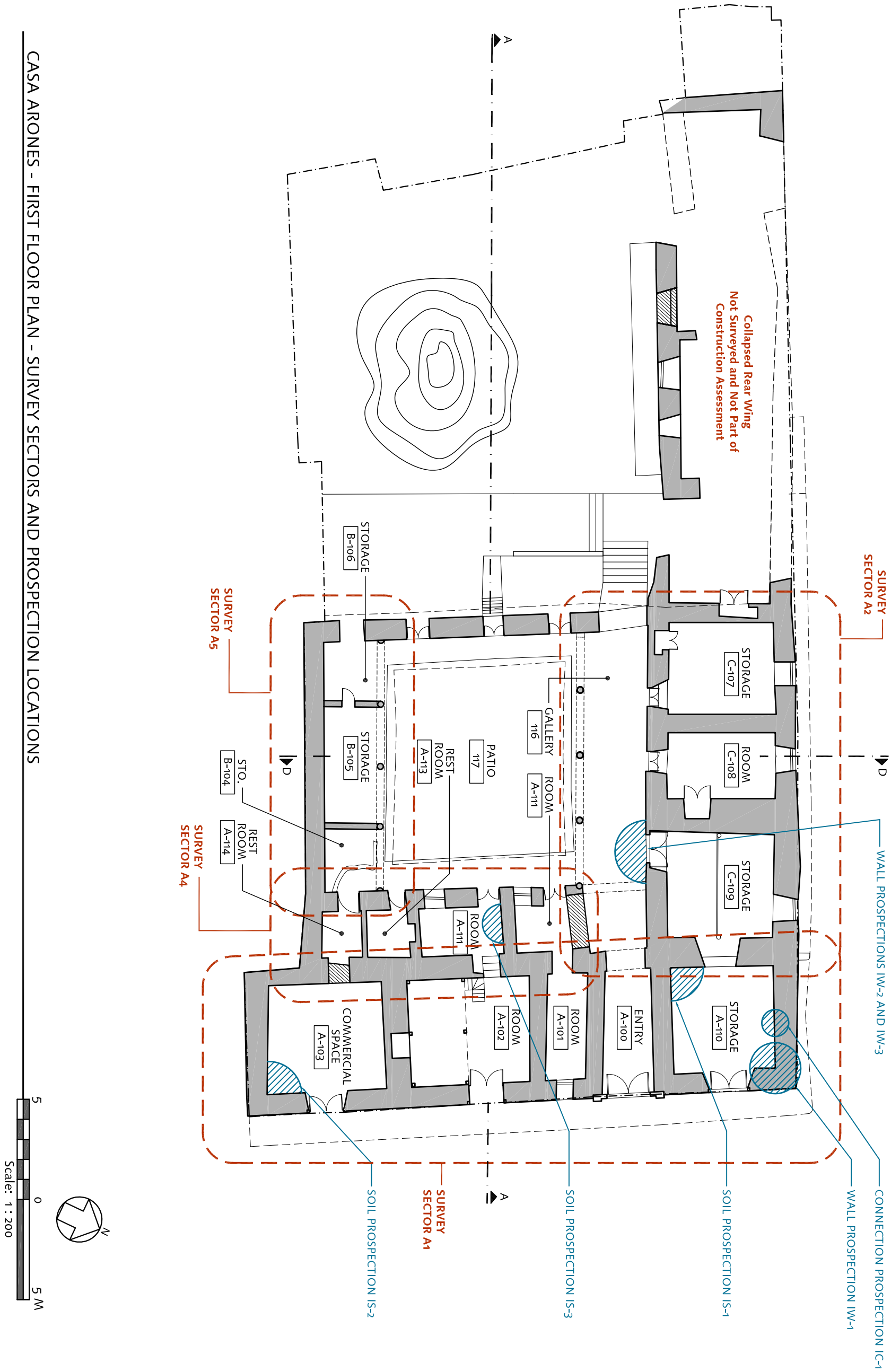
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:200

Sheet No.:
CA-6

CASA ARONES - FIRST FLOOR PLAN - SURVEY SECTORS AND PROSPECTION LOCATIONS



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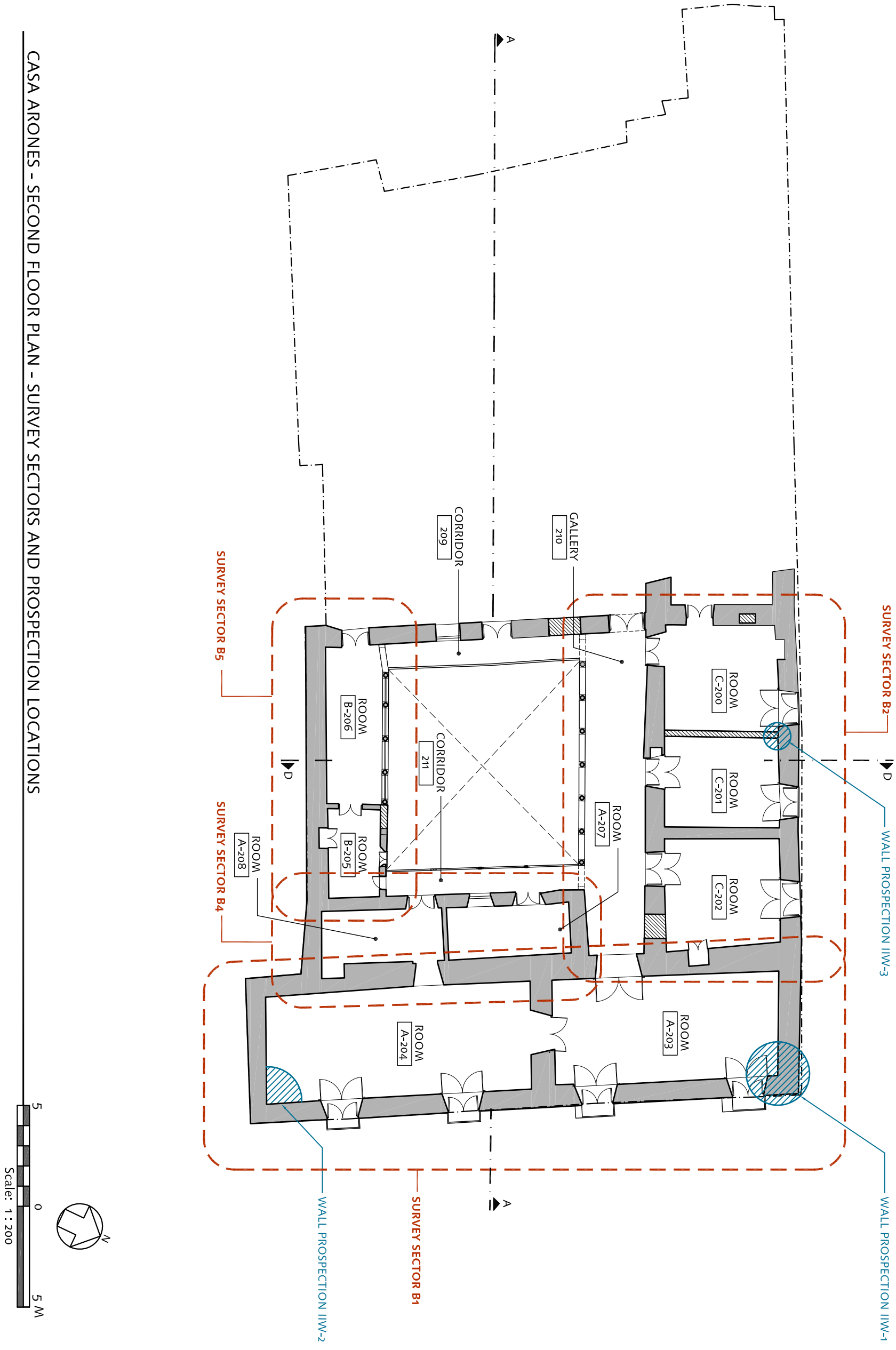
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building: CASA ARONES, Cusco, Perú	Base Drawing Prepared By: Arq. Enrique Estrada; Arqtas. Yise La Ochoa Lind, Veronica Villagarcia, and Sofia Valenza L.	Date: May 16, 2011
		Scale: 1:200
Sheet Title: First Floor Plan, Survey Sectors and Prospection Lodations	Survey Facilitator: Universidad Católica Sedes Sapientiae	Sheet No.: CA-7
	Drawing Edited By: S. Lardinois and C. Cancino	

CASA ARONES - SECOND FLOOR PLAN - SURVEY SECTORS AND PROSPECTION LOCATIONS



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PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
CASA ARONES
Cusco, Perú

Sheet Title:
Second Floor Plan
Survey Sectors and
Prospection Lodations

Base Drawing Prepared By:
Arq. Enrique Estrada
Arqtas. Yise La Ochoa Lind, Veronica Villagarcia, and Sofia Valenza L.

Survey Facilitator:
Universidad Católica Sedes Sapientiae

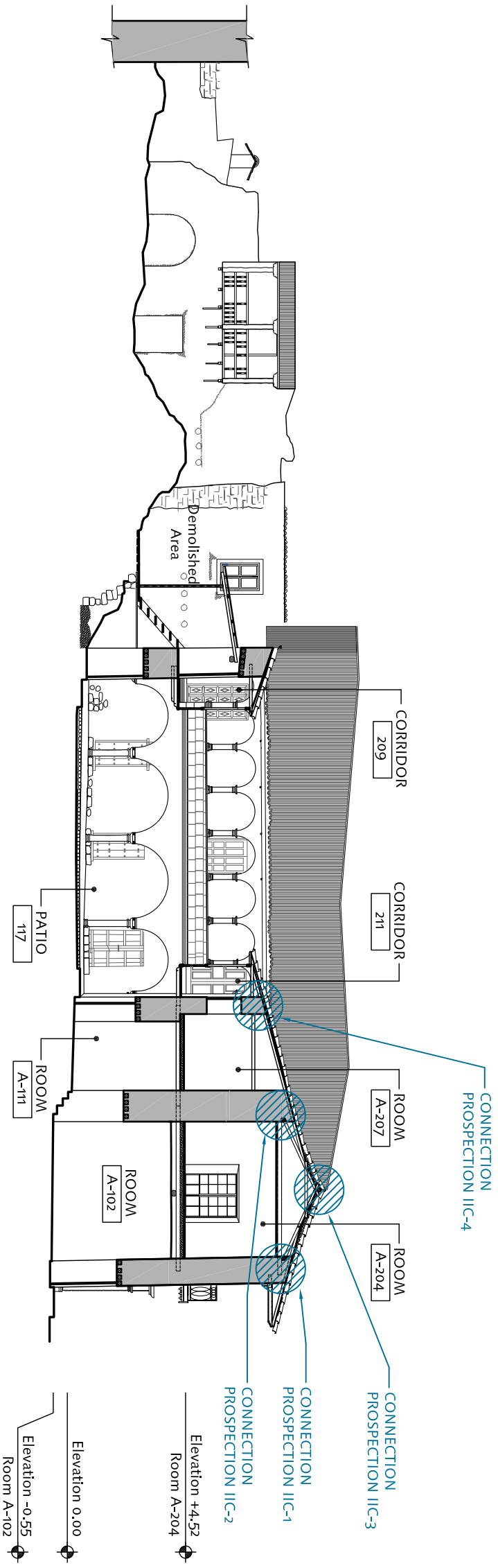
Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

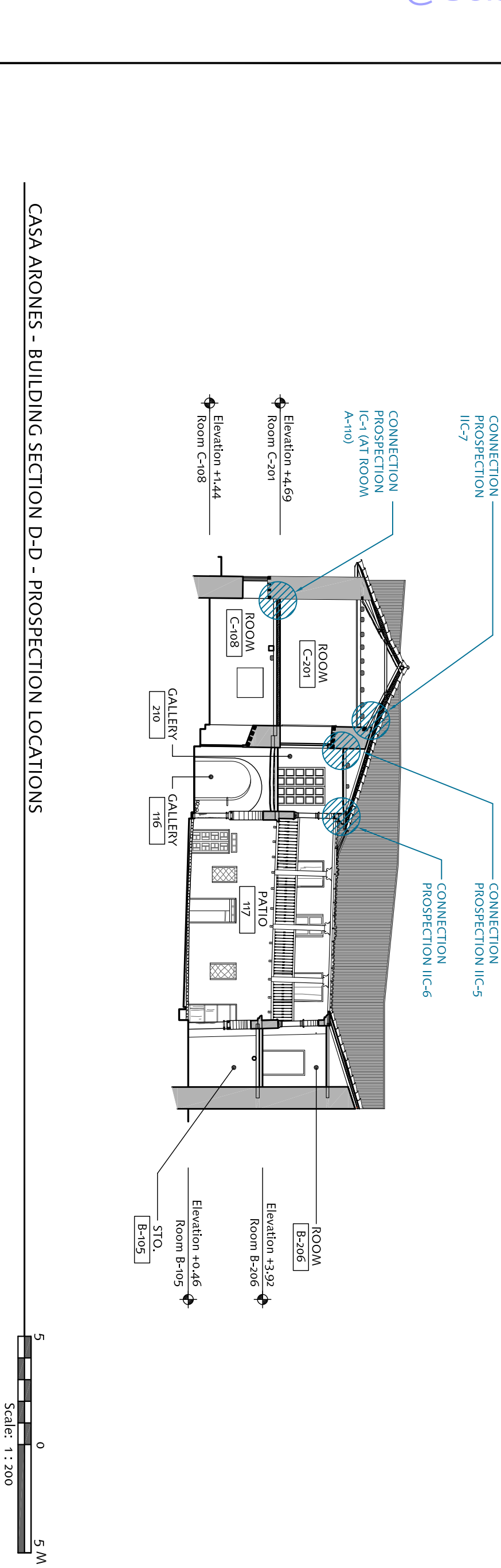
Scale:
1:200

Sheet No.:
CA-8

CASA ARONES - BUILDING SECTION A-A - PROSPECTION LOCATIONS



CASA ARONES - BUILDING SECTION D-D - PROSPECTION LOCATIONS



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UNIVERSITY OF BATH
PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

Building:
CASA ARONES
Cusco, Perú

Sheet Title:
Building Sections
Prospection Locations

Base Drawing Prepared By:
Arq. Enrique Estrada
Arqtas. Yise La Ochoa Lind, Veronica Villagarcia, and Sofia Valenza L.

Survey Facilitator:
Universidad Católica Sedes Sapientiae

Drawing Edited By:
S. Lardinois and C. Cancino

Date:
May 16, 2011

Scale:
1:200

Sheet No.:
CA-9