



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

ENGINEERING GRAPHICS AND DESIGN P1

NOVEMBER 2022

MARKS: 100

TIME: 3 hours

This question paper consists of 6 pages.

Barcode label

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FOUR questions.
2. Answer ALL the questions.
3. ALL drawings are in first-angle orthographic projection, unless otherwise stated.
4. ALL drawings must be prepared using pencil and instruments, unless otherwise stated.
5. ALL answers must be drawn accurately and neatly.
6. ALL the questions must be answered on the QUESTION PAPER, as instructed.
7. ALL the pages, irrespective of whether the question was attempted or not, must be re-stapled in numerical sequence in the TOP LEFT-HAND CORNER ONLY.
8. Time management is essential in order to complete all the questions.
9. Print your examination number in the block provided on every page.
10. Any details or dimensions not given must be assumed in good proportion.

FOR OFFICIAL USE ONLY															
QUESTION	MARKS OBTAINED			$\frac{1}{2}$	SIGN	MODERATED			$\frac{1}{2}$	SIGN	RE-MARKING			$\frac{1}{2}$	SIGN
1															
2															
3															
4															
TOTAL															
	2	0	0			2	0	0			2	0	0		

FINAL CONVERTED MARK	CHECKED BY
100	

COMPLETE THE FOLLOWING:
CENTRE NUMBER
CENTRE NUMBER
EXAMINATION NUMBER
EXAMINATION NUMBER



LAND SURVEYOR'S CERTIFICATE OF THE CORNER HEIGHTS AND BOUNDARY LENGTHS OF STAND 3414			
CORNER HEIGHTS IN METRES		BOUNDARY LENGTHS IN MILLIMETRES	
A	1600	AB	24230
B	1600	BC	8370
C	1599	CD	18380
D	1599	DE	31200
E	1601	EA	32400

SYMBOL LEGEND	
	EVERGREEN TREES
	BUSHES
	2000 HIGH SECURITY FENCE
	1800 HIGH PALLISADE FENCE

NOTE:
Contractors must verify all dimensions and levels on site before commencing work. Architects to be notified immediately of any discrepancies.

ARCHITECT'S SIGNATURE

CLIENT'S SIGNATURE

ANSWER 18

In the space below, draw, in neat freehand, the SANS 10143 hatching (symbol) for a (18.1) FACE BRICK WALL, and graphical symbol for a (18.2) STAIRCASE.

18.1

18.2

REVISION	DATE	DESCRIPTION	DRAWN
2	07/01/22	ADD WATER METER	USA B
1	06/01/22	COLOUR NEW ADDITION RED	USA B

KOMBELLA, JOUBERT & MINNAAR
ARCHITECTURAL DESIGN
365 BORCHARDS AVENUE
ERASMA
0183
012 685 1857 www.kjmdesign.co.za

PRINTED BY: STEVENS PRINTERS
DATE OF PRINT: 08/01/2022

DRAWING TITLE:
SITE PLAN

PROJECT:
PROPOSED NEW ADDITION FOR
MR N KEENAN
ON STAND 3414,
21 DOMBEYA STREET, HARRISMITH

PROJECT NUMBER: FTW2022-59
DRAWING NUMBER: 1 OF 5

DATE: 05/01/2022
DRAWN: CASPER
CHECKED: ANNIE Q
SCALE: 1 : 350

REFERENCE CODE:
K1N-2022

QUESTION 1: ANALYTICAL (CIVIL)

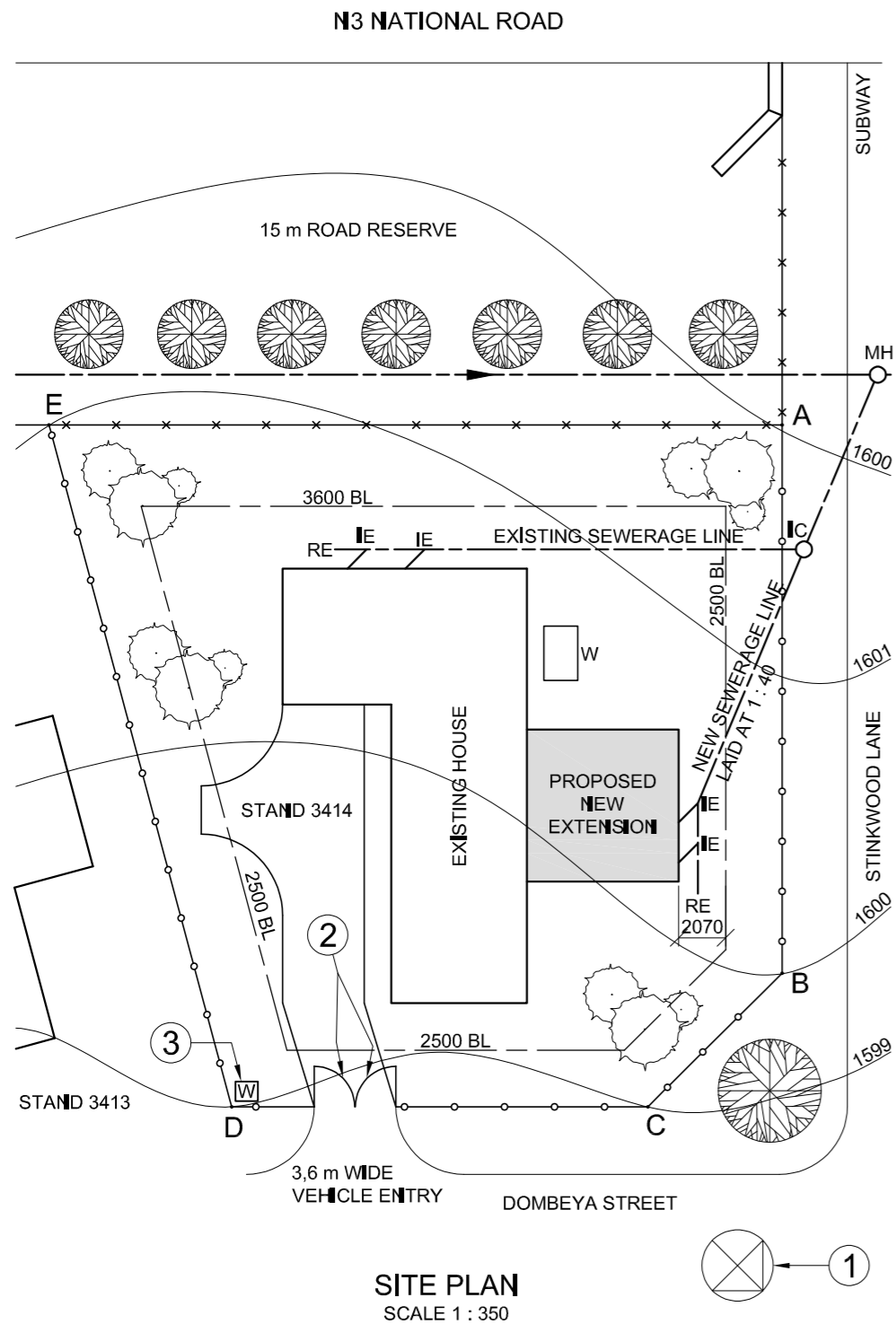
Given:

The site plan of an existing house with a proposed new extension, a title panel and a table of questions. The drawing has not been presented to the indicated scale.

Instructions:

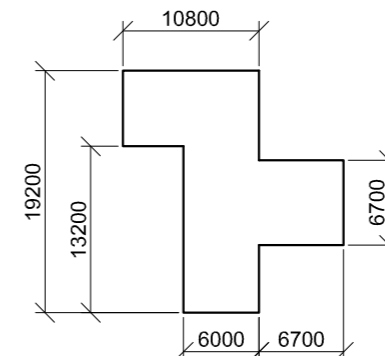
Complete the table below by neatly answering the questions, which refer to the accompanying drawing, title panel and civil content. **[30]**

QUESTIONS		ANSWERS	
1	What does the number FTW2022-59 refer to?	1	
2	Who is the client?	1	
3	What is the title of the drawing?	1	
4	What action was taken on 08/01/2022?	1	
5	Who was responsible for preparing the revisions to the drawing?	1	
6	How wide is the road reserve in millimetres?	1	
7	Whose signatures are required on the site plan?	2	
8	How many new inspection eyes are shown on the site plan?	1	
9	What does the abbreviation RWDP stand for?	1	
10	Which corner of STAND 3414 is the highest?	1	
11	Determine the shortest distance from the proposed new extension to boundary line AB in metres.	1	
12	What is indicated in BLUE on floor plans and/or sections?	2	
13	Name the feature at 1.	1	
14	What is indicated by the arcs at 2?	1	
15	Name the feature at 3.	1	
16	What does the ratio 1 : 40 on the new sewerage line indicate?	1	
17	Which elevation of the existing house faces the N3 national road?	2	
18	In the space in the title panel (ANSWER 18), draw, in neat freehand, the SANS 10143 hatching (symbol) for a (18.1) FACE BRICK WALL, and graphical symbol for a (18.2) STAIRCASE.	4	
19	In the space below (ANSWER 19), determine the total length of the 1800 high pallisade fence required for STAND 3414, in metres.	3	
20	In the space below (ANSWER 20), determine the total area of the house, including the new extension, in square metres. Show the answer to TWO decimal places.	3	
TOTAL		30	



ANSWER 19
Show ALL calculations.

ANSWER 20
Show ALL calculations.



EXAMINATION NUMBER	
EXAMINATION NUMBER	2



QUESTION 2: SOLID GEOMETRY

Given:

- The front view and top view of a right square pyramid that rests against a right regular pentagonal prism
- An auxiliary view of the right square pyramid
- Cutting plane R-R

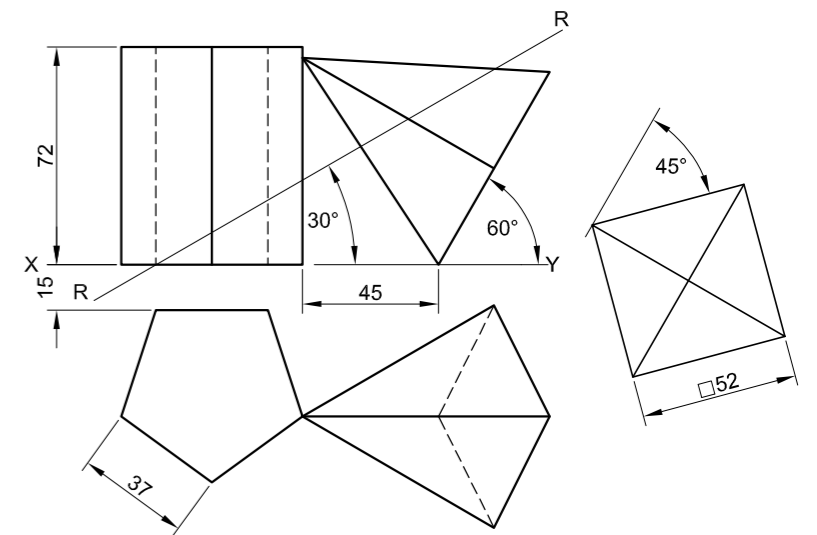
Instructions:

Draw, to scale 1 : 1, the following views of both solids:

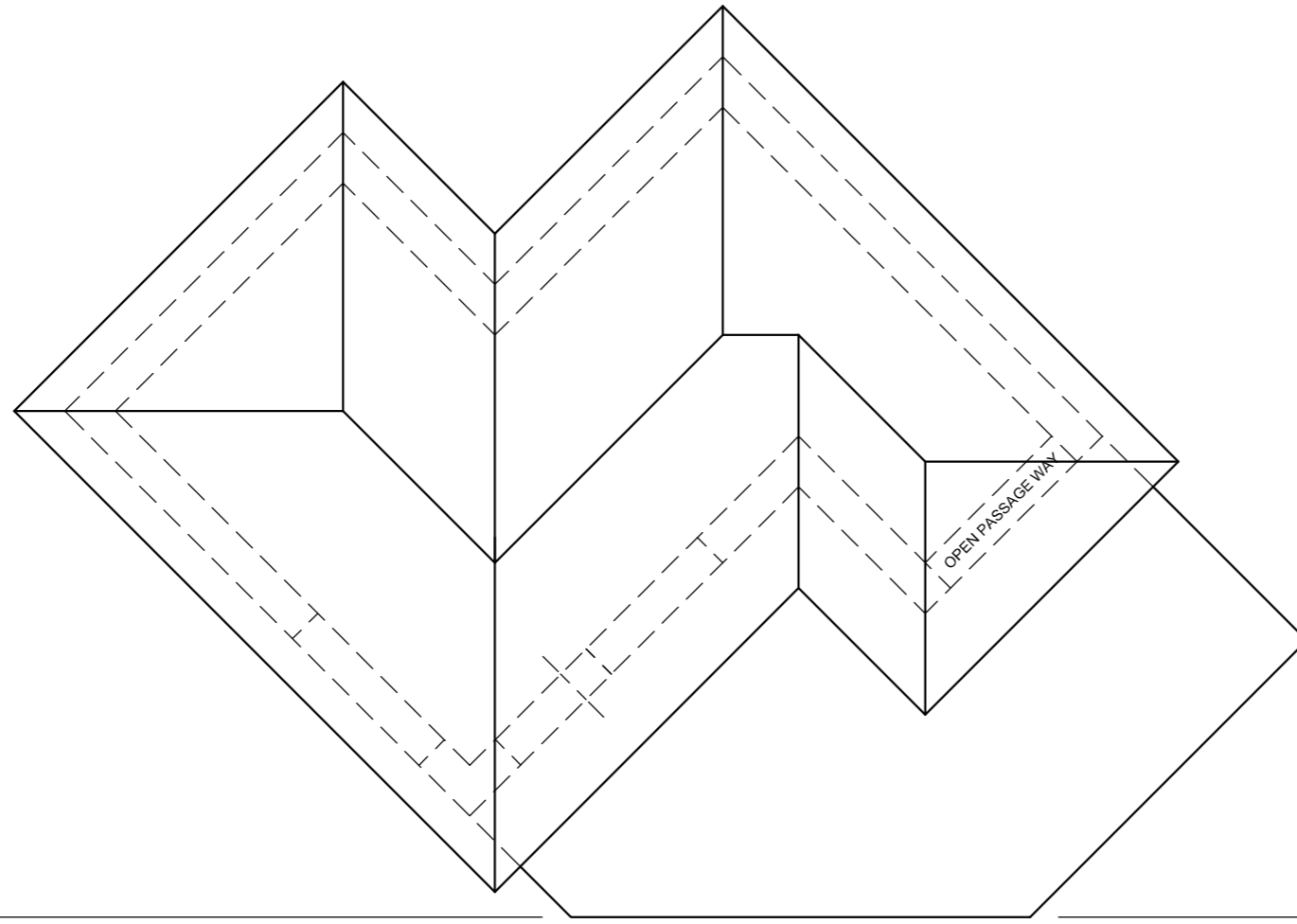
- 2.1 The given front view
- 2.2 A sectional top view with the parts above cutting plane R-R removed
- 2.3 A sectional right view with the parts below cutting plane R-R removed
- 2.4 The true shape of the cut surfaces of BOTH solids

- Planning is essential.
- Show ALL hidden detail.
- Show ALL construction.

[37]



ASSESSMENT CRITERIA				
1	FRONT VIEW	7		
2	SECTIONAL TOP VIEW	12 1/2		
3	SECTIONAL RIGHT VIEW	10		
4	TRUE SHAPE	6 1/2		
5	CORRECT HATCHING	1		
PENALTIES (-)				
TOTAL		37		
EXAMINATION NUMBER				
EXAMINATION NUMBER				
				3



QUESTION 3: PERSPECTIVE

Given:

Three views of a club house and the information needed to draw a two-point perspective drawing
 PP – Picture plane
 HL – Horizon line
 GL – Ground line
 SP – Station point

Instructions:

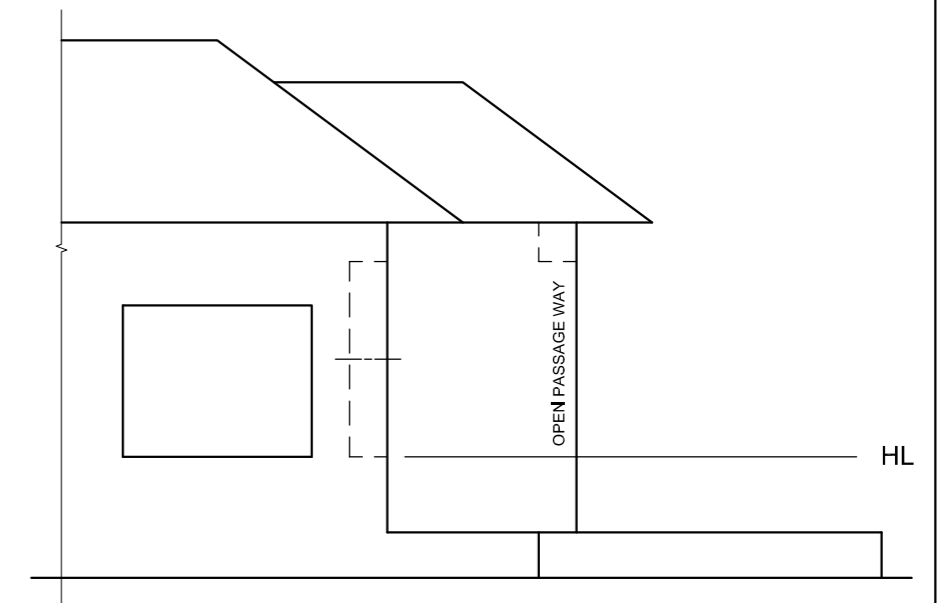
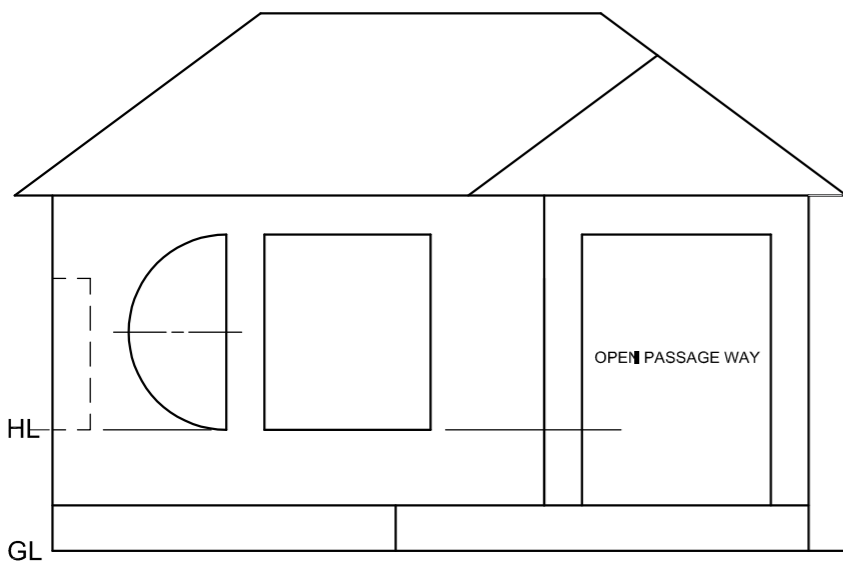
Complete the perspective drawing.

- Align the drawing sheet with the ground line (GL).
- Determine and label the vanishing points.
- Show ALL construction.
- Show depth at the windows.
- NO hidden detail is required.

[41]

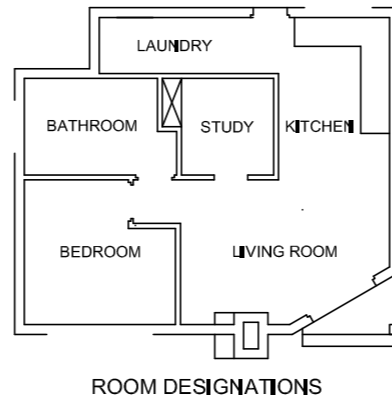
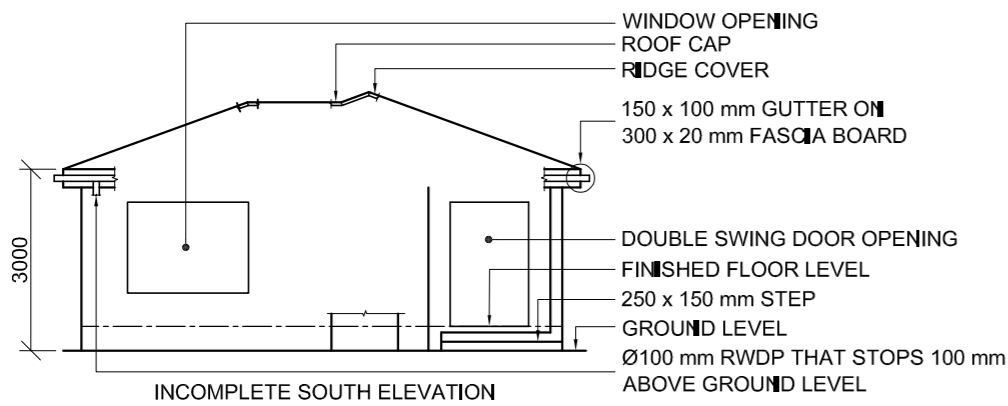
ASSESSMENT CRITERIA				
1	CONSTRUCTION	6		
2	WALL + BASE	10 1/2		
3	WINDOWS + OPENING	10		
4	ROOF	7 1/2		
5	ARC	7		
PENALTIES (-)				
TOTAL		41		

PP

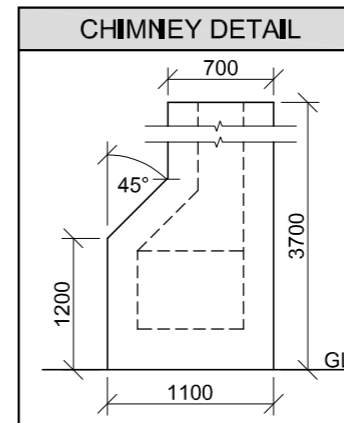


SP

EXAMINATION NUMBER	
EXAMINATION NUMBER	4



FLOOR FINISHES
 LAUNDRY: TILES
 BATHROOM: TILES
 STUDY: CARPET
 KITCHEN: TILES
 BEDROOM: CARPET
 LIVING ROOM: WOOD



QUESTION 4: CIVIL DRAWING

Given:

- The incomplete south elevation of a new house, showing the walls, window and double swing door openings, step, position of the chimney, roof and labels
- The incomplete floor plan showing the walls, step, positions of the doors, windows, chimney and fixtures, as well as electrical layout
- An incomplete schematic diagram of a roof truss and roof notes
- The incomplete foundation and external wall detail
- Room designations and floor finishes
- A table with chimney detail
- A door and window schedule
- A table of electrical symbols
- A table of fixtures
- The incomplete floor plan and position of the ground level of the new house, drawn to scale 1 : 50, and the incomplete foundation and a break line for the detailed section, drawn to scale 1 : 20, on page 6.

Instructions: Answer this question on page 6.

4.1 Using the given incomplete floor plan and ground level, draw, to scale 1 : 50, the following views of the new house:

4.1.1 THE COMPLETE FLOOR PLAN

Add the following features to the drawing:

- ALL doors and windows
- ALL fixtures as indicated by the abbreviations
- ALL electrical fittings as indicated by the numbers
- ALL the roof lines
- ALL hatching detail

4.1.2 THE COMPLETE SOUTH ELEVATION

Show the following features on the drawing:

- The outside walls, step, chimney, window and double swing door detail
- The roof detail, including the fascia boards, gutters and rainwater down-pipe
- The finished floor level

4.2 Using the given incomplete foundation and break line on page 6, draw, to scale 1 : 20, a DETAILED SECTION on cutting plane A-A of the area in the ellipse shown on the incomplete floor plan.

Show the following features on the drawing:

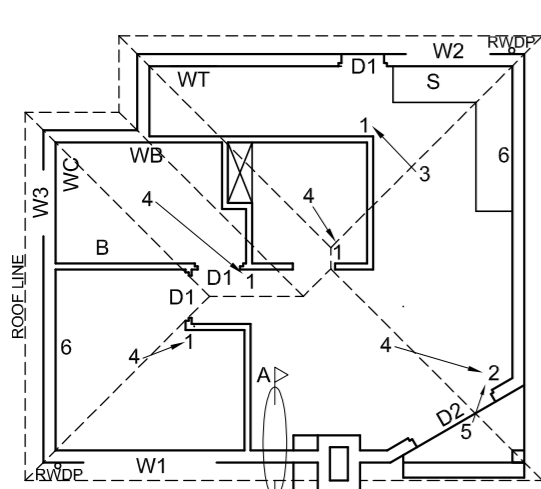
- The complete foundation and external wall detail
- The roof detail, including the fascia board and gutter
- The chimney and the double swing door and frame to the right (east) of cutting plane A-A
- ALL hatching detail. ONLY the substructure hatching may be drawn in neat freehand.

Label the following:

- The south elevation
- The floor finishes
- Ground level, finished floor level and damp-proof course (use the correct abbreviation and show it on ALL relevant views).

NOTE:

All drawings must comply with the guidelines and graphical symbols as contained in the SANS 10143. [92]

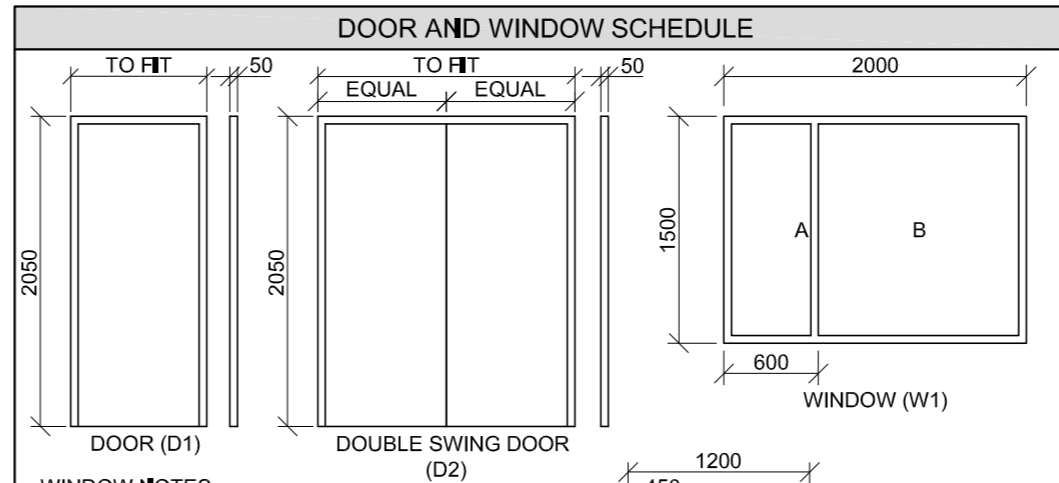


FEATURES
 D1 DOOR
 D2 DOUBLE SWING DOOR
 W1 WINDOW
 W2 WINDOW
 W3 WINDOW

FIXTURES
 WC TOILET
 WB WASH BASIN
 WT WASH TUB
 S SINK
 B BATH

ELECTRICAL FITTINGS
 1. ONE-WAY SWITCH - SINGLE-POLE
 2. ONE-WAY SWITCH - DOUBLE-POLE
 3. FLUORESCENT LIGHT 2 x 40 W
 4. CEILING LIGHT
 5. WALL-MOUNTED LIGHT
 6. SWITCHED SOCKET OUTLET

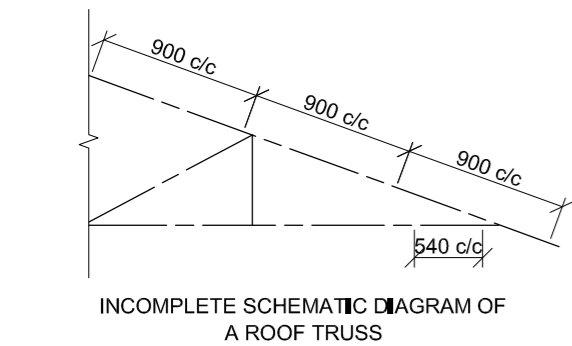
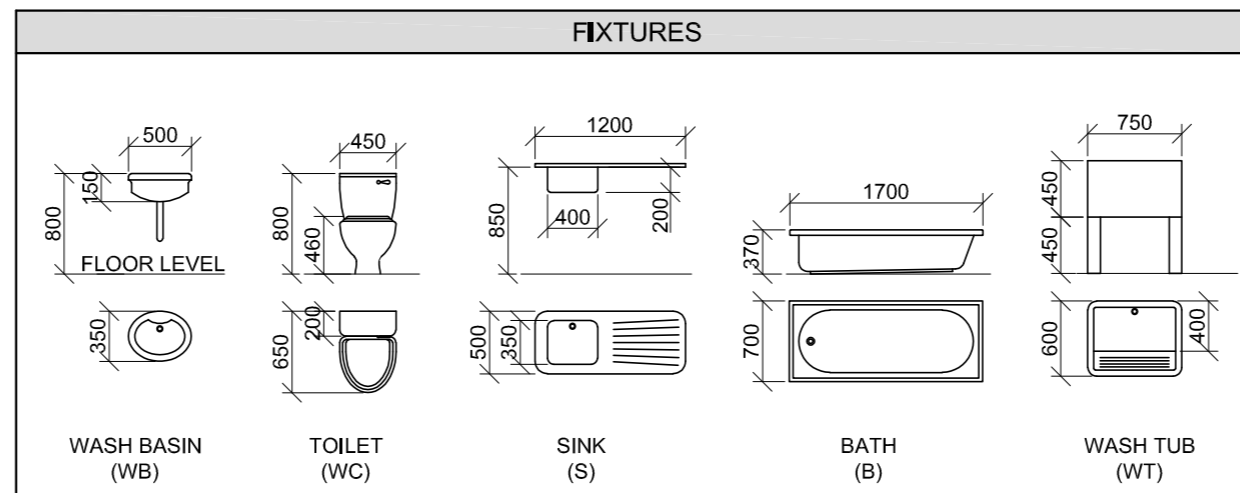
NOTE:
 THE ARROW SHOWS THE LIGHT CONNECTION TO THE SWITCH.



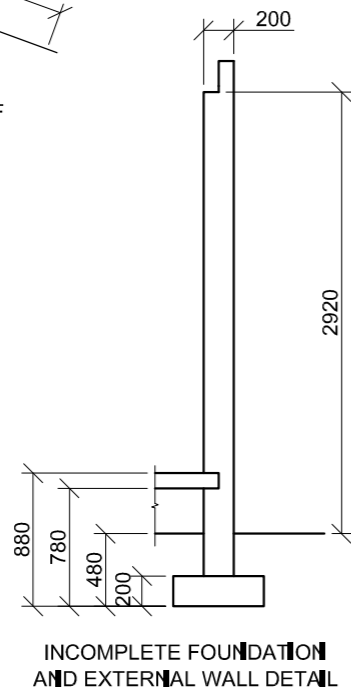
WINDOW NOTES:
 • A = OPENING SIDE
 • B = FIXED PANEL
 • ALL FRAMES = 50 mm
 • 150 x 20 mm FIBRE CEMENT SILL UNDER ALL WINDOWS

ELECTRICAL SYMBOLS	

ROOF COMPONENTS	
	300 x 20 mm FASCIA BOARD
	150 x 100 mm GUTTER
	ROOF CAP AND RIDGE COVER

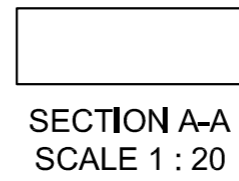
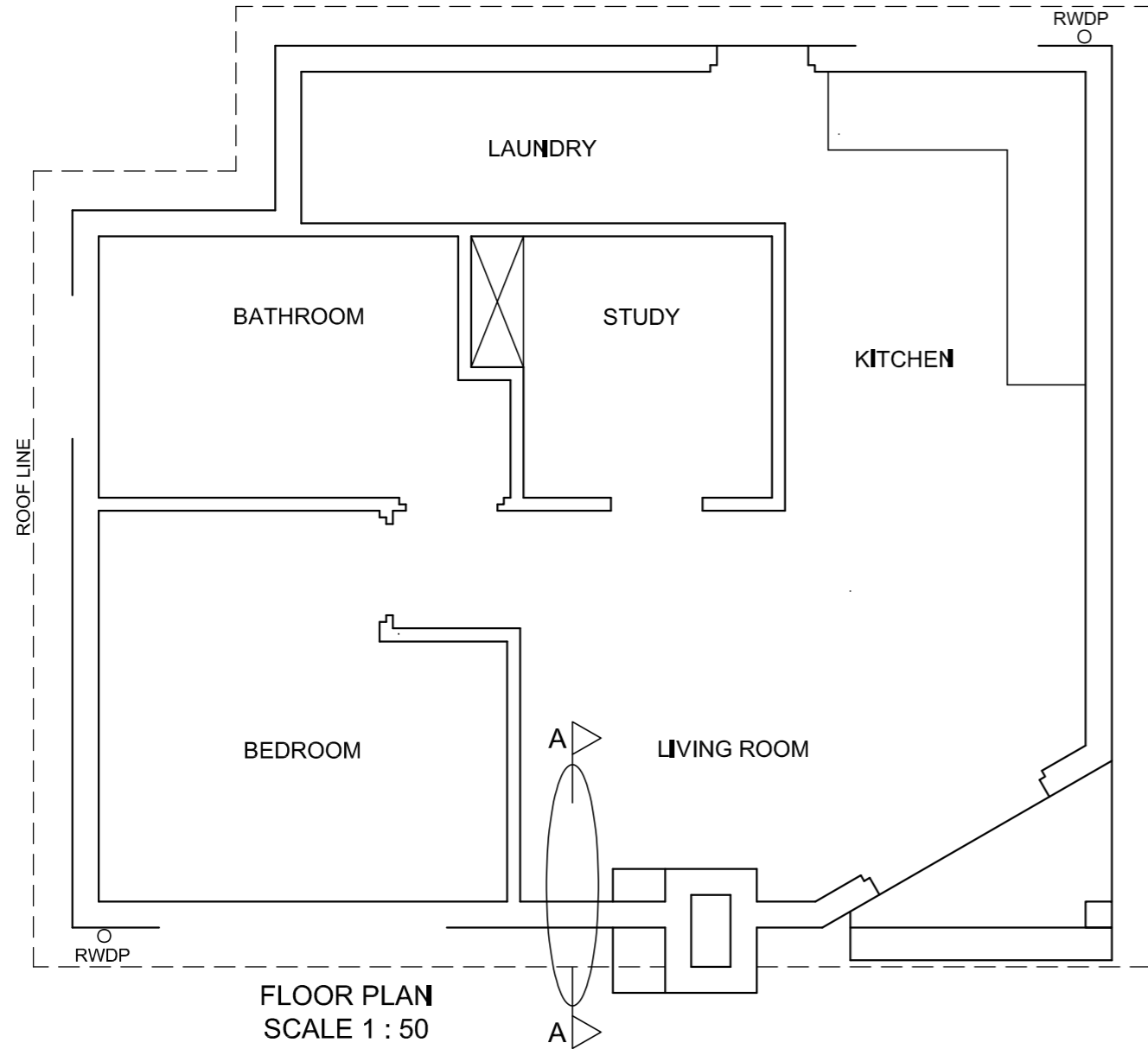


ROOF NOTES:
 20° ROOF PITCH
 114 x 40 mm ROOF TRUSSES ON
 114 x 40 mm WALL PLATES
 300 mm ROOF OVERHANG TO END OF ROOF TRUSS
 20 mm CORRUGATED ROOF SHEETING ON
 75 x 50 mm PURLINS @ 900 mm c/c
 300 x 20 mm FASCIA BOARDS WITH
 150 x 100 mm GUTTERS ON ALL SIDES
 10 mm CEILING BOARD ON 40 x 40 mm
 BRANDING STRIPS @ 540 mm c/c





GL



MARK ALLOCATION FOR SECTION OF ROOF		FOR OFFICIAL USE ONLY	
A		INCORRECT SCALE(S) USED	
B		NON-ALIGNMENT OF VIEWS	
C		VIEW(S) ROTATED	
D		SECTION VIEWED INCORRECTLY	
E		INCORRECT LETTERING	
F			
G			
H			
TOTAL		TOTAL	

ASSESSMENT CRITERIA					
FLOOR PLAN					
		POSSIBLE	OBTAINED	SIGN	MODERATED
1	DOORS + WINDOWS	11			
2	FIXTURES + ROOF LINES	15			
3	ELECTRICAL	10			
4	HATCHING	3			
5	LABELS	3			
SUBTOTAL		42			
SOUTH ELEVATION					
1	ROOF + RWDP	8 1/2			
2	WALLS + STEP + CHIMNEY + FFL	7			
3	DOOR + WINDOW	7			
4	LABELS	1			
SUBTOTAL		23 1/2			
DETAILED SECTION					
1	ROOF DETAIL	11 1/2			
2	SLAB + WALL + CHIMNEY	8			
3	HATCHING	3 1/2			
4	DOOR	2 1/2			
5	LABELS	1			
SUBTOTAL		26 1/2			
TOTAL		92			
PENALTIES (-)					
GRAND TOTAL					
EXAMINATION NUMBER					
EXAMINATION NUMBER					