



Bar Bending & Concreting

Level-II

Learning Guide-#14

**Unit of Competence: Read and Interpret Plans
and Working Drawings**

**Module Title: Reading and Interpreting Plans
and Working Drawings**

LG Code: EIS BBC2 M05 1019 LO1-LG-14

TTLM Code: EIS BBC2 M05 TTLM 0919v1

LO1. Identify types of drawings and their purpose

Page 0 of 28	Federal TVET Agency Author/Copyright	Bar Bending and Concreting Level II	Version -1 October 2019
--------------	---	-------------------------------------	----------------------------



Instruction Sheet	Learning Guide #14
--------------------------	---------------------------

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Identifying types of drawings
- Purpose and advantages of drawings
- Aspects of drawing

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, **upon completion of this Learning Guide, you will be able to:**

- Identify the purpose and advantage of different types of drawing.
- Identify different aspects of drawings.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information “Sheet 1, Sheet 2, and Sheet 3”.
4. Accomplish the “Self-check 1, Self-check 2, and Self-check 3”
5. Check the answers for your achievement from the answer key

Information Sheet-1	Identifying types of drawings
----------------------------	--------------------------------------

1.1. Types of Construction Drawings

There are different types of drawing used for the construction process. Depending upon the purpose they serve, construction drawings are divided into 5 types,

1.1.1. Architectural Drawing

Architectural drawing can be termed as the mother drawing for all the other drawings used for construction. It contains all the details of the project such as location site plan, setting out plan, elevations, sections and other details.

- **Concept drawings/Sketch Plans:** A sketch is a rapidly executed freehand drawing that is not usually intended as a finished work. Sketches can be made in any drawing medium. Concept drawings or sketches are drawings, often freehand, that are used by designers such as architects, engineers and interior designers as a quick and simple way of exploring initial ideas for designs.

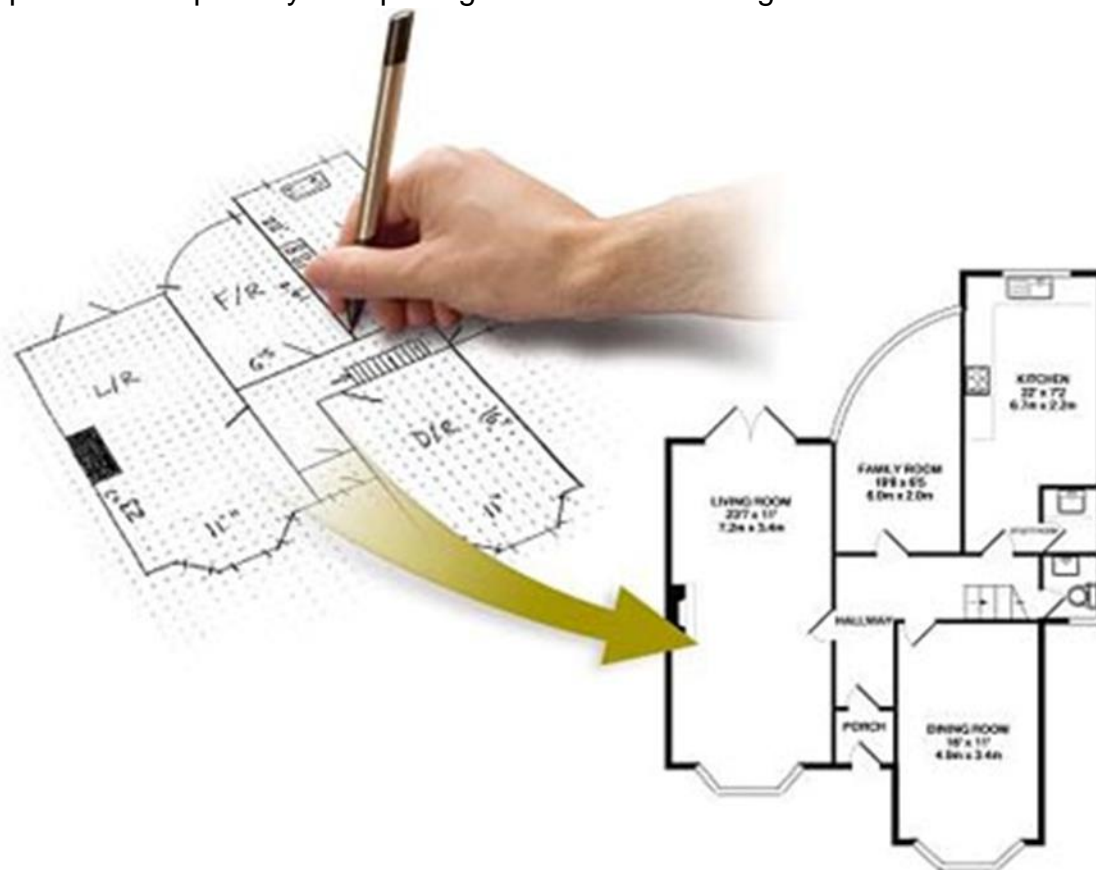


Fig. 1.1: concept/sketch floor plan



Fig.1.2: sketch elevation plan

- Site / Block plan:** It represents the location, orientation and information about the site's topography, landscaping utilities, and site work. Block plans usually show the siting of a project in relation to Ordnance Survey Maps. Conventions are used to depict boundaries, roads and other details. Depending on the size of the project, recommended scales are: 1:2500, 1:1250, and 1:500.



Fig.1.3: typical site/block plan



- **Location drawings/ general arrangement drawings (GA):** Location drawings generally cover the drawings and descriptions of the basic elements of a location proposed for a construction project. The important elements covered under these drawings are floor plans, site plans, elevations and road layouts.
- **Location plan:** A location plan is a supporting document that may be required by a planning authority as part of a planning application. A location plan provides an illustration of the proposed development in its surrounding context.
- **Perspective drawing:** Perspective drawing is a technique for depicting three-dimensional volumes and spatial relationships based on the eye level and vanishing point (or points) of the viewer. It can give a realistic impression of what a volume or space will look like in reality. Constructing perspective drawings of buildings is extremely complicated, but has been much simplified recently by the development of computer aided design (CAD), building information modelling (BIM) and other forms of computer-generated imagery (CGI).
- **Working Plan:** This drawing gives the information of horizontal dimensions of the building, thickness of walls, clear spaces inside the building and column locations. it also shows the openings required in the building such as doors, windows and ventilators.
- **Floor plans:** Floor plans are a form of orthographic projection that can be used to show the layout of rooms within buildings, as seen from above. They may be prepared as part of the design process, or to provide instructions for construction, often associated with other drawings, schedules, and specifications.



Fig.1.4: Rendered floor plan



- **Section Drawings:** Section drawings represent the material of construction to be used, heights and measurement of the different components of buildings, type of structural components such as type of slab, etc. It is representing the drawing when the building is cut through a vertical plane.
- **Elevation Drawing:** it represents the information of openings, size and shape of external surface, height of building and finish of the building after completion. These drawings are made by having an aesthetic view of the building.



Fig.1.5: 2D External Elevation.

1.1.2. Structural Drawing:

Structural Drawing can be termed as the backbone drawing of the building. It consists all the information about the structural intervention that are coming on a building. It contains many types of drawing with very minute details and description.

- **General Note:** This is more of a code and by laws of the buildings. No drawing is found in this, but the details of all the structural drawings are mentioned in this such as concrete mix, lapping length, curing time, abbreviation, codes and work procedures.
- **Excavation Drawing**

This drawing represents the footing excavation dimension, column position, footing plan and grid lines of column.

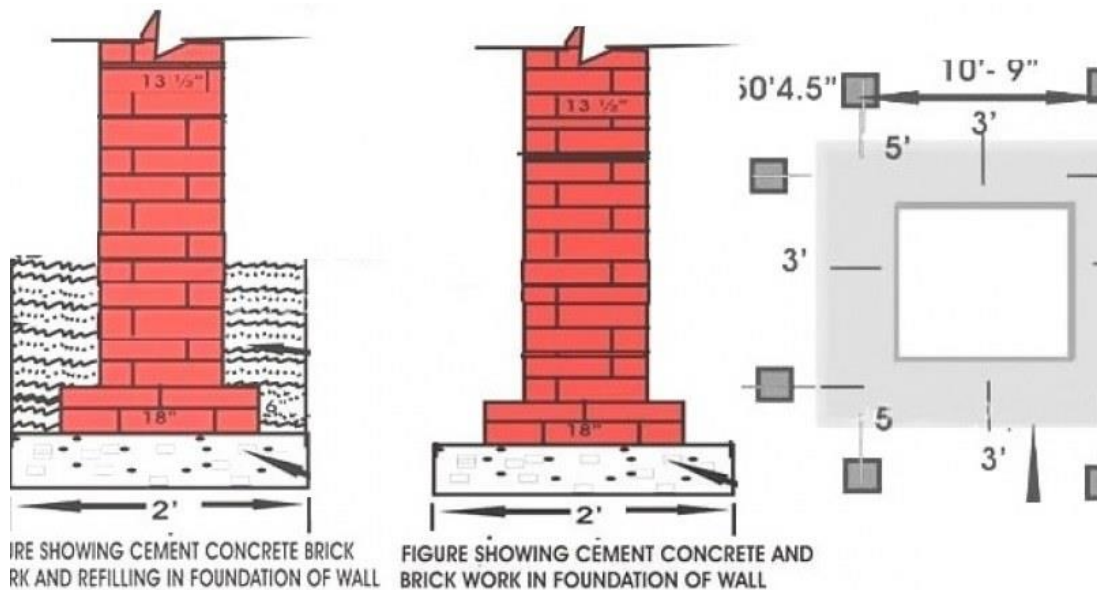


Fig. 1.6: footing excavation drawing

- **Column Layout:** It represents the position and orientation of columns and column reinforcement details.

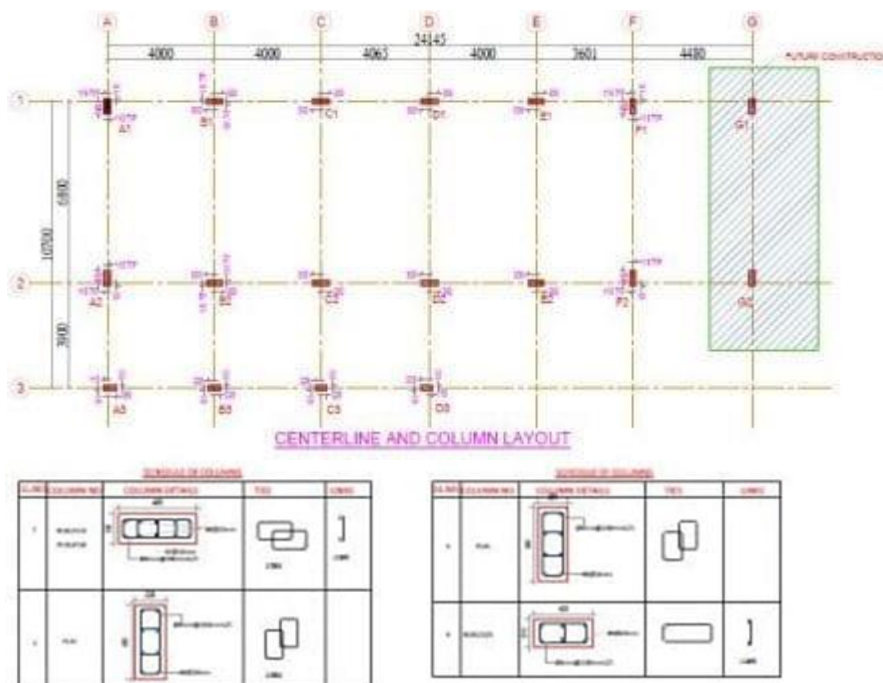


Fig. 1.7: Column Layout

- **Plinth Beam Layout**

This drawing represents the dimensions, position and section of plinth beam and the details of reinforcement in plinth beam.

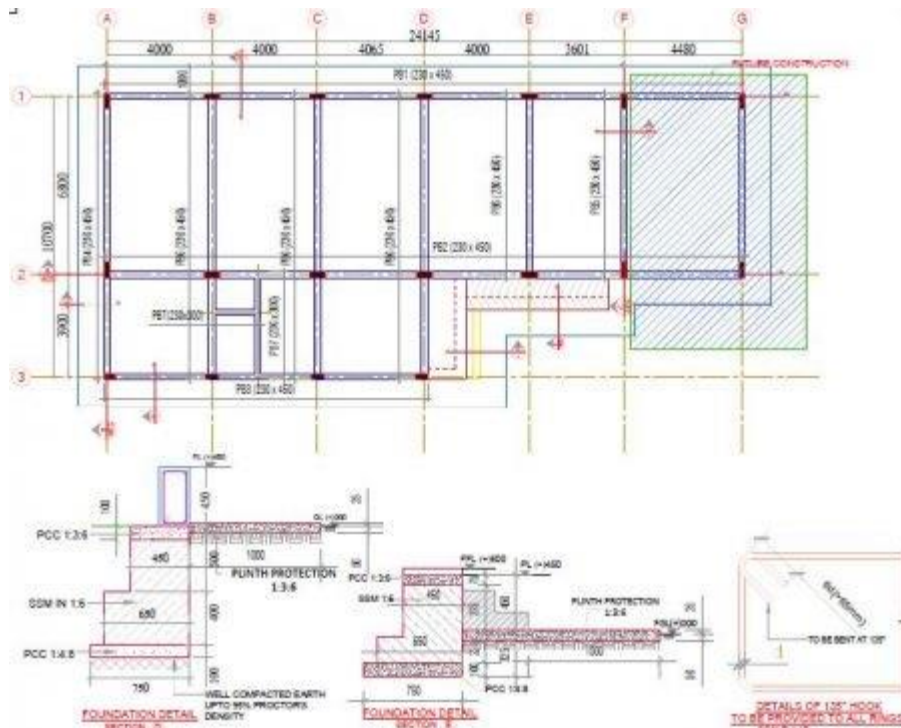


Fig. 1.8: Plinth Beam Layout

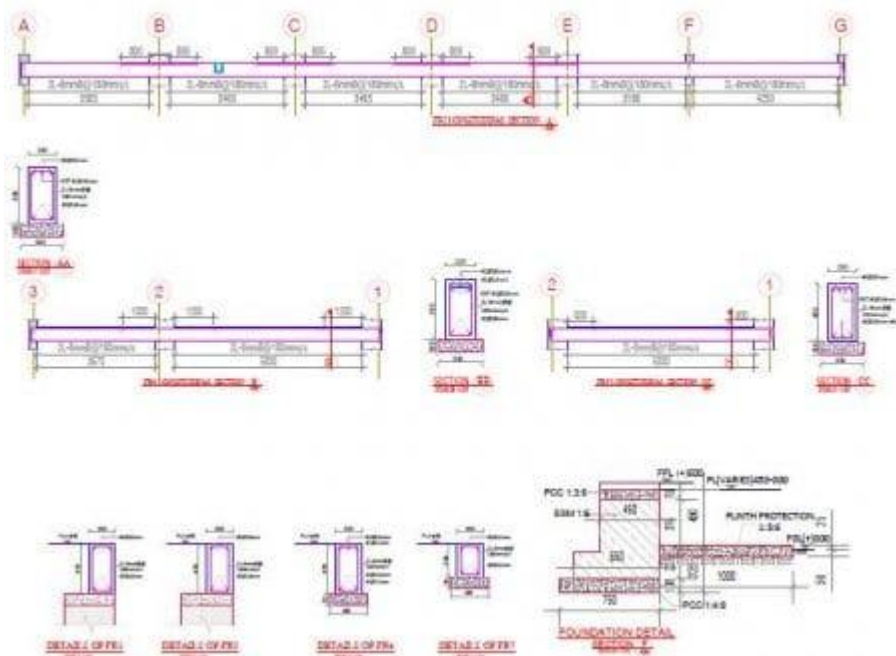


Fig. 1.9: Plinth Beam Details

- Lintel Beam Layout** This drawing represents the dimensions, position and section of lintel beam and the details of reinforcement in lintel beam.

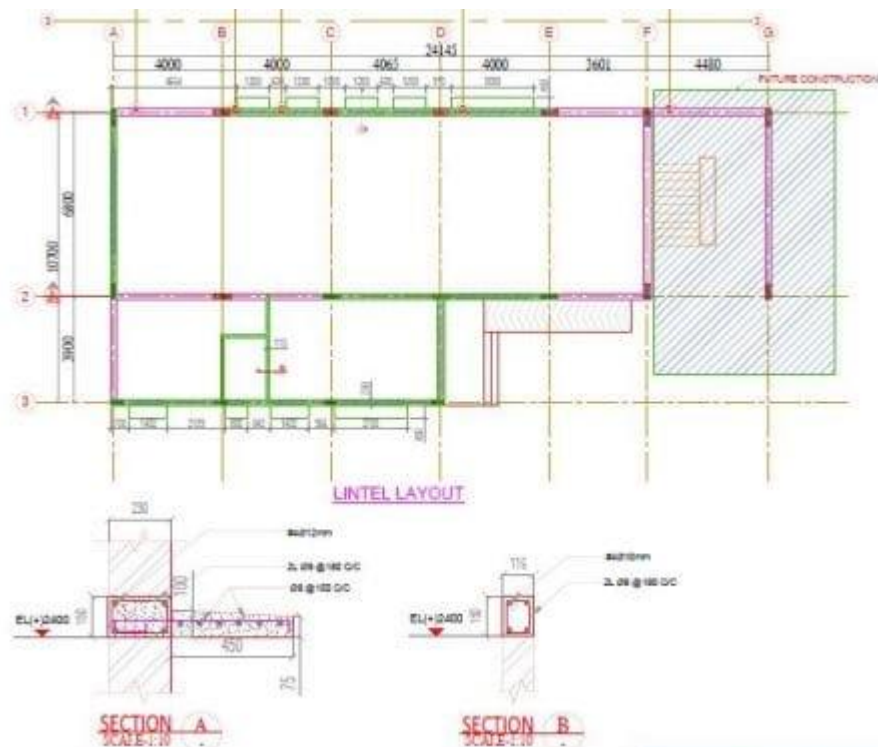


Fig 1.10: Lintel Beam Layout and Details

- **Roof Beam and Shuttering Layout:** This drawing represents the details of reinforcement of roof beam, its section and shuttering details.

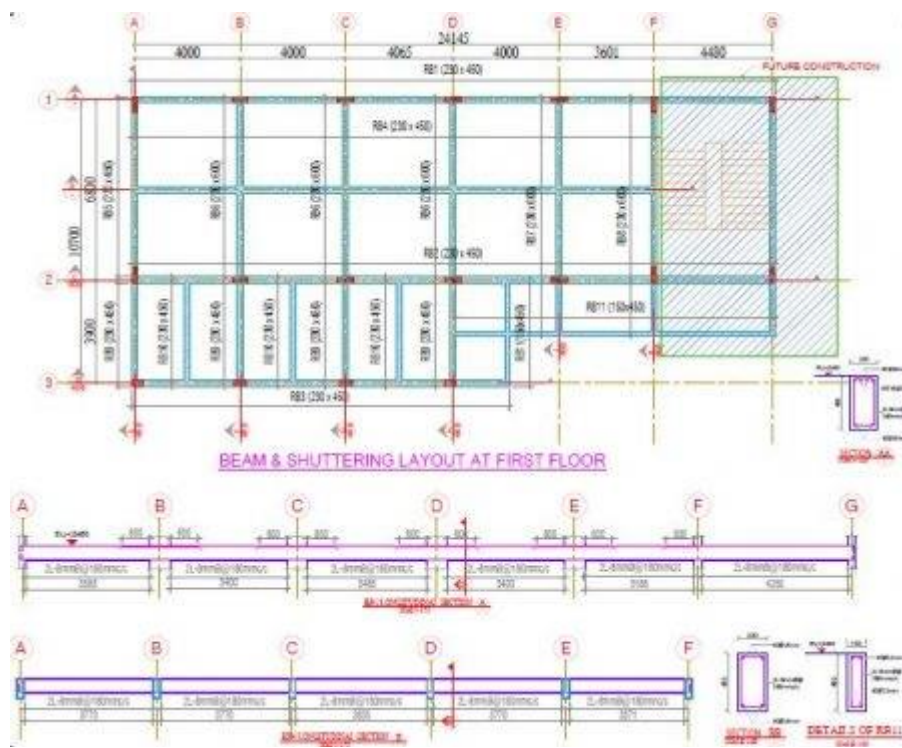


Fig 1.11: Roof Beam and Shuttering Layout

- **Roof Slab Layout:** This drawing represents the details of reinforcement of roof slab, its section and openings in the roof for various purpose such as stairs or skylight.

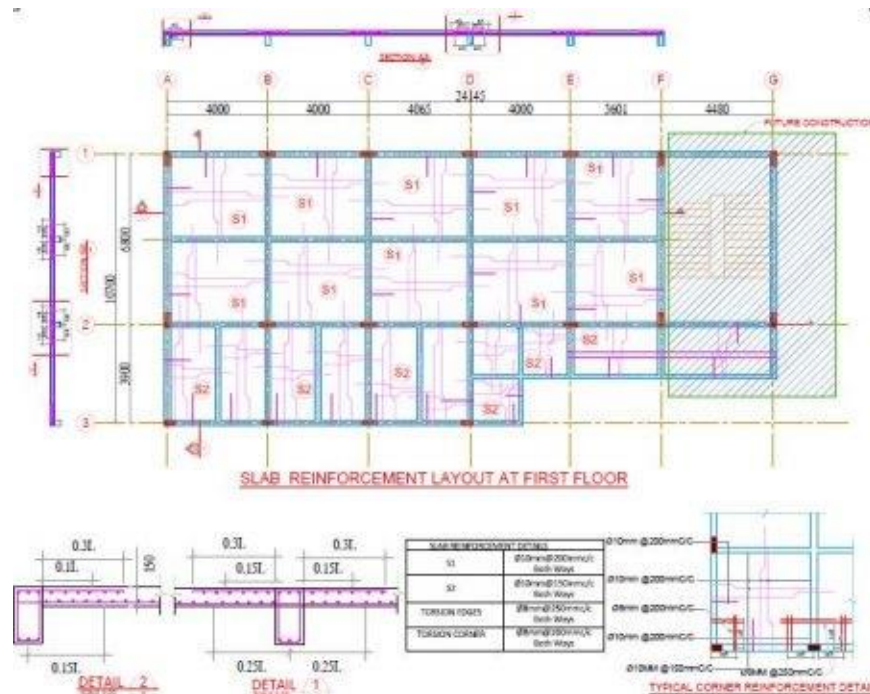


Fig 1.12: Roof Slab Layout

1.1.3. Electrical Drawing

Electrical drawing represents the details of electrical fixtures, location of switches, fan, light and others. It also represents the load calculation, tapping for electricity, wiring path and other interventions such as AC and UPS and its components.

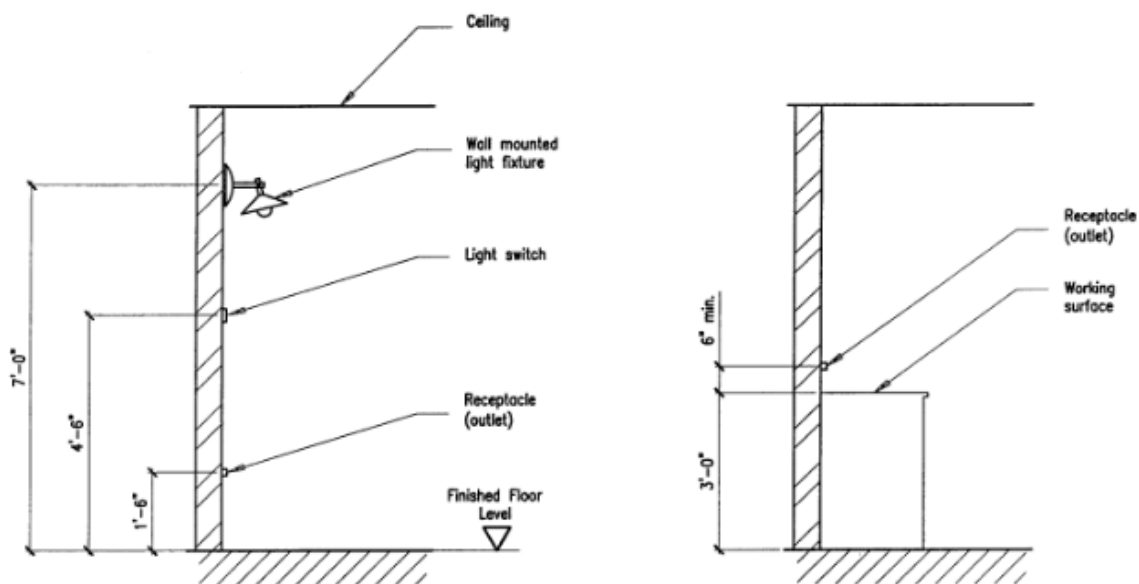


Fig 1.13: typical sections of wall showing locations of fixtures

1.1.4.Plumbing Drawing

Plumbing drawings give the location of sanitary, piping for water supply system, fixture, and the process to connect every fixture.

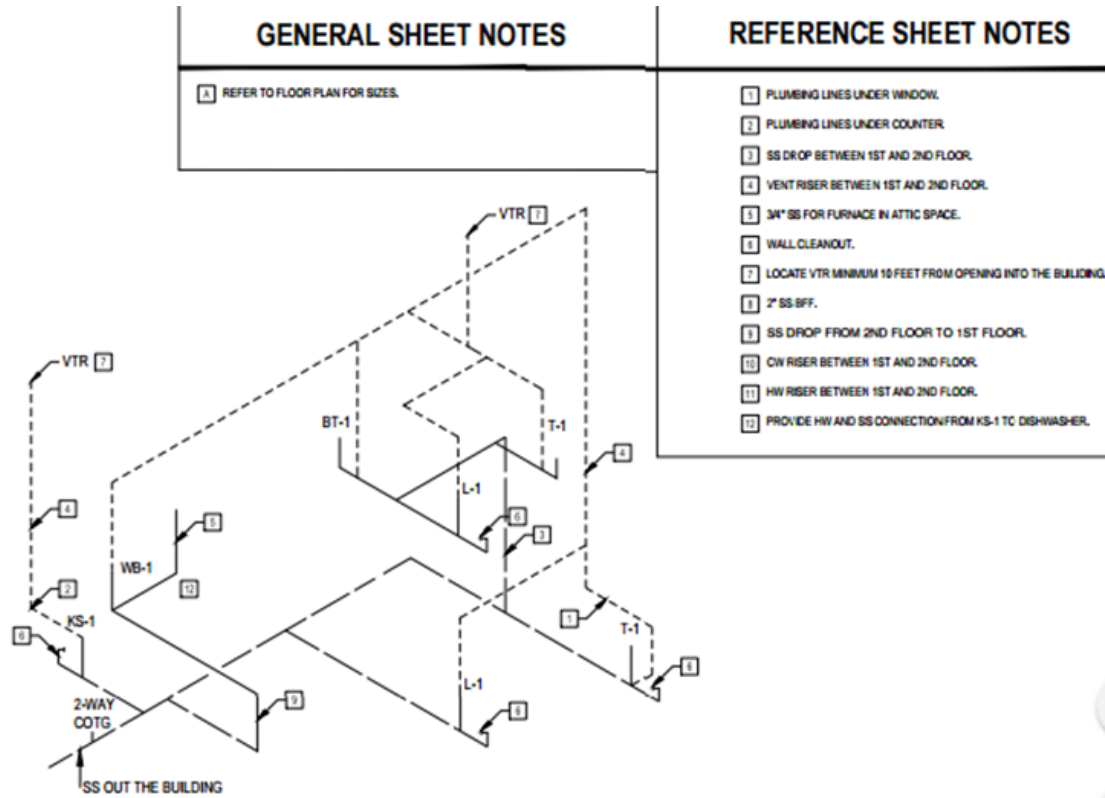


Fig 1.14: sanitary waste & vent isometric view

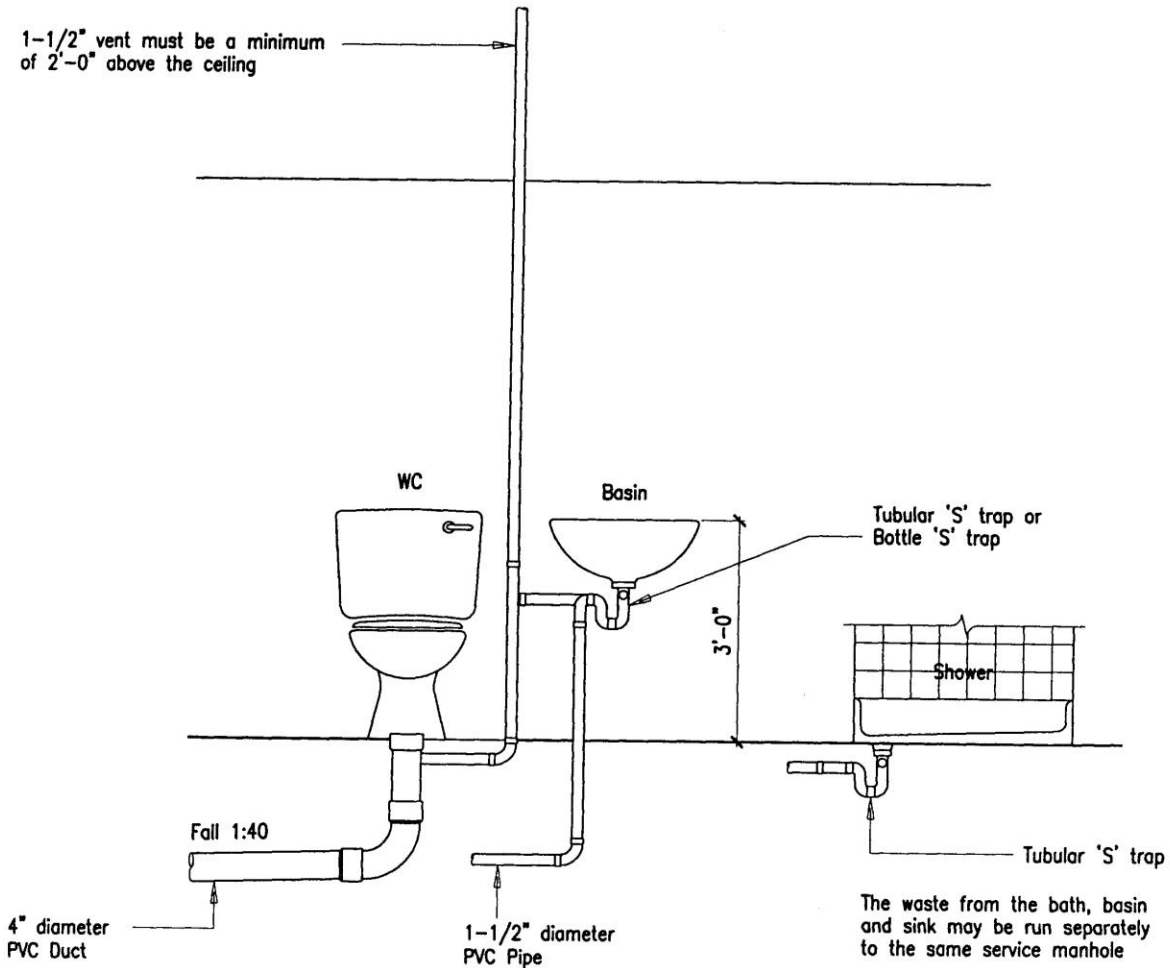


Fig 1.15: sanitary riser diagram

1.1.5. Finishing Drawings

Finishing drawings represents the finish type of every component of the building such as flooring pattern, painting color, false ceiling shape, plastering texture and elevation design. These details are sometime given in elevation drawings also. There is no standard rule of drawings required for a project. Depending upon the type of building and requirement, types of drawings are made and issued.

**Self-Check -1****Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. _____ is type of drawing that show the material of construction to be used, heights and measurement of the different parts of buildings. (3 points)
A. Concept drawing C. section plan
B. Floor plan D. general arrangement drawing

2. _____ is a drawing that contains location site plan, setting out plan, elevations, sections and other details of the project. (5 points)
A. Architectural drawing C. structural drawings
B. finishing drawing D. detail drawing

Note: Satisfactory rating - 3 and 5 points

Unsatisfactory - below 3 and 5 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Information Sheet- 2	Purpose and advantages of drawings
-----------------------------	---

2.1. Importance of Construction Drawings in Construction works

Construction drawing is fundamentally the pictorial and written form of representation of any construction, including every bit of detail such as wall color, furniture, floor space, material details, outlets, lighting, equipment etc. It is used as a final drawing on basis of which engineers proceed to further development.

Construction-Drawings is used as a document which specifies all necessary information and requirements such as:

- Full view of a construction including all dimensions
- Elevation view and sectional view from all sides
- Sectional view of each wall
- Manufacturer details (name, phone number etc.) of the paint colors which are used for wall painting, furniture painting etc.
- Material details of each part, e.g. materials of window and door can be of steel, plastic, wood, iron etc., roof can be of asbestos, wood, concrete materials (cement) etc.
- Furniture dimension, materials, space occupancy, finishing (I.e. polishing type) etc.

Dimensions within a Construction drawing basically represent the position of its associated components. The written text is used for pointing those particular components for giving further description. Legends are used to give specification of corresponding components like material, color etc. of walls, doors, stairs, windows etc.

Construction drawings are fundamentally created for newly constructed buildings or for renovation of existing buildings. It can vary from anywhere between 10 pages to 100 pages depending on the type of project.

Construction drawing can be made in separate parts, like – Architectural, Structural, Mechanical part or assembly drawing, MEP system drawing etc.

Architectural drawing plays a key role in the field of Construction engineering consists of:

- Exterior Elevation of a building from all directions
- Interior and Exterior Floor plan drawings
- Roof plan and truss detail drawings



- Foundation wall drawings
- Cross-section drawings of a building from various angles
- Space plan drawing

Structural drawing plays a very important role, consists of the components like:

- Steel building drawing
- Joist connection drawings
- Rebar shop drawings
- Anchor-Bolt Drawings
- Structural Analysis

MEP drawing consists of:

- HVAC system drawings
- Piping system drawings
- Electrical system drawing

Mechanical drawing includes:

- Mechanical product drawings
- Equipment parts and assembly drawing

Construction drawings are created on the basis of local standard code for a building. Before proceeding to the next step, these drawings require necessary approval from the concerned authorities.

Earlier, Construction drawings were created manually using paper which was very strenuous and time consuming. Nowadays, it is made on computer using CAD tools. AutoCAD is the most commonly used CAD tool utilized for this kind of drawing. Off late, many new software versions (i.e. Revit 2014, AutoCAD 2014, ArchiCAD 15 etc.) are also being launched in the market to simplify the process of Construction Drawing.

**Self-Check -2****Written Test**

Directions: Answer all the questions listed below.

1. _____ is component of MEP drawing (5 points)
A) Joint connection drawing C) equipment assembly drawing
B) HVAC system drawing D) foundation wall drawing

2. List components of structural drawing. (3 points)

Note: Satisfactory rating - 3 and 5 points

Unsatisfactory - below 3 and 5 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



3.1. Site Plan Requirements

The required site plan shall consist of all the details of the proposed development submitted for review by this department. All plans shall be accurately drawn to scale of not less than 1" equals 20' and contained on a sheet size not less than 8 1/2" X 11". All proposals must clearly illustrate the following BASIC SITE PLAN features 1-6 and only larger projects must include MAJOR SITE PLAN features 7-13.

3.1.1. Basic site plans

- Verified property line location, dimensions, direction from back of the curb or side walk to property line, dimension of parkway strip, lot square footage, scale and north arrow direction.
- Streets, alley, affected easements, and right-of-way
- Location & dimensions of all hard-surfaced areas including curb and gutter, sidewalks, driveways, parking spaces, loading areas, garbage areas, and access points to public streets or alleys.
- The size, shape, and location of all existing and proposed structures including overhang projections, garages, carports, sheds, and the distance to the nearest point of any dwelling on abutting properties. 10' required from garage to nearest dwelling on adjacent lot(s).
- Front, side, and rear yard setback dimensions from property line to all existing and proposed structures
- Parking strip layout, including lawn areas, location of existing & proposed street trees, sprinkler system, & curb cuts

3.1.2. Major site plans

- The size, shape, & location of all existing landscape features including large trees, pools, decks, patios, exterior lighting, utility lines, steams, & any other element
- Landscape plan including location, spacing, size, quantity, & type of all proposed plant materials & installation details



- Sprinkler plan including location, spacing, & size of all shrub or lawn heads, water lines, & valves.
- Location & height of fences, retaining walls, & railings
- Contour lines indicating existing & proposed grade changes at intervals not to exceed 2'
- Location, height, size, & design of all existing & proposed exterior signs & advertising features
- Location & type of catch basins or surface water detention basins, other surface drainage facilities and all existing & proposed public way improvements

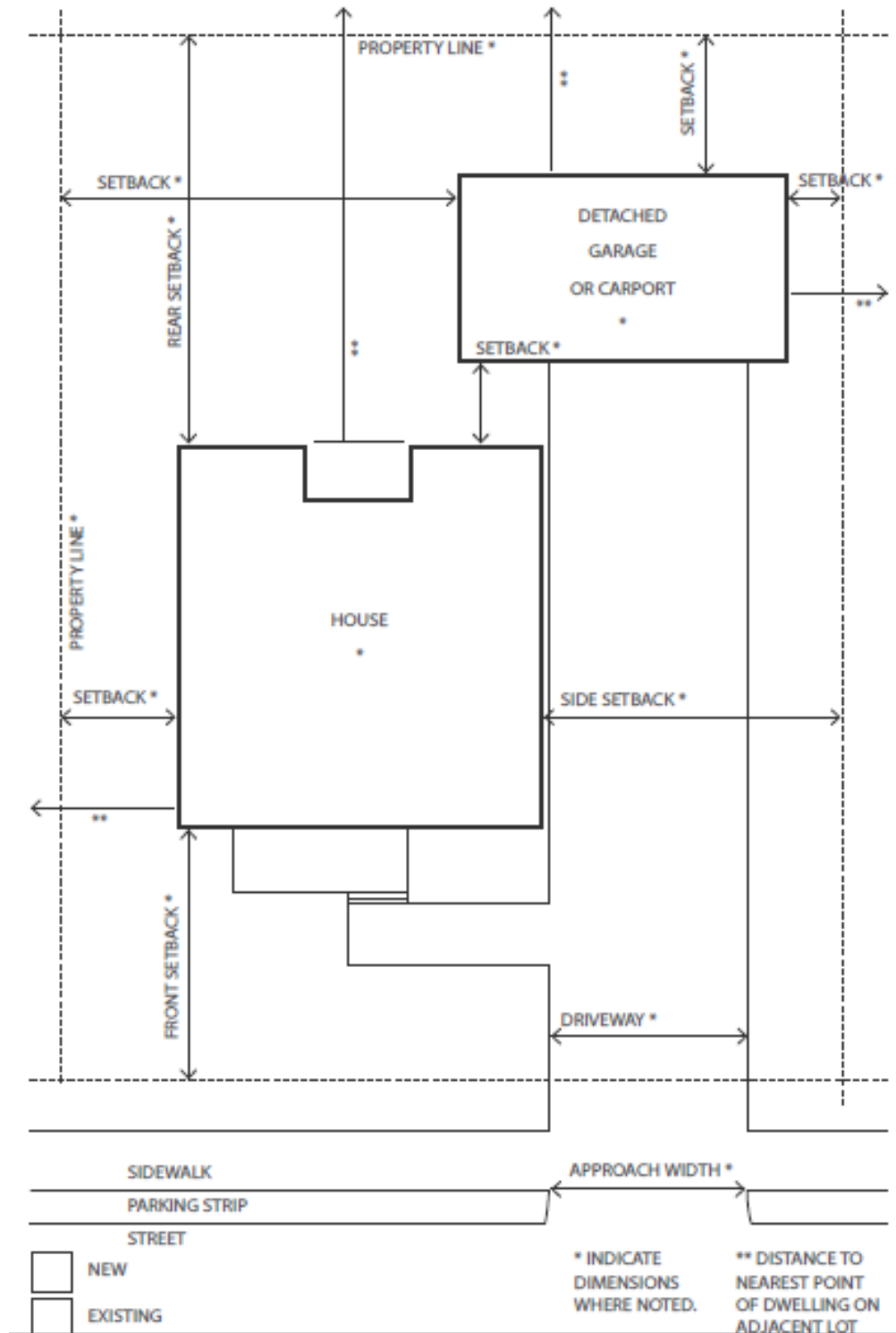


Fig 3.1: typical site plan

- **Floor plan features**

The floor plan may depict an entire building, one floor of a building, or a single room. It may also include measurements, furniture, appliances, or anything else necessary to

the purpose of the plan. Floor plans are useful to help design furniture layout, wiring systems, and much more.

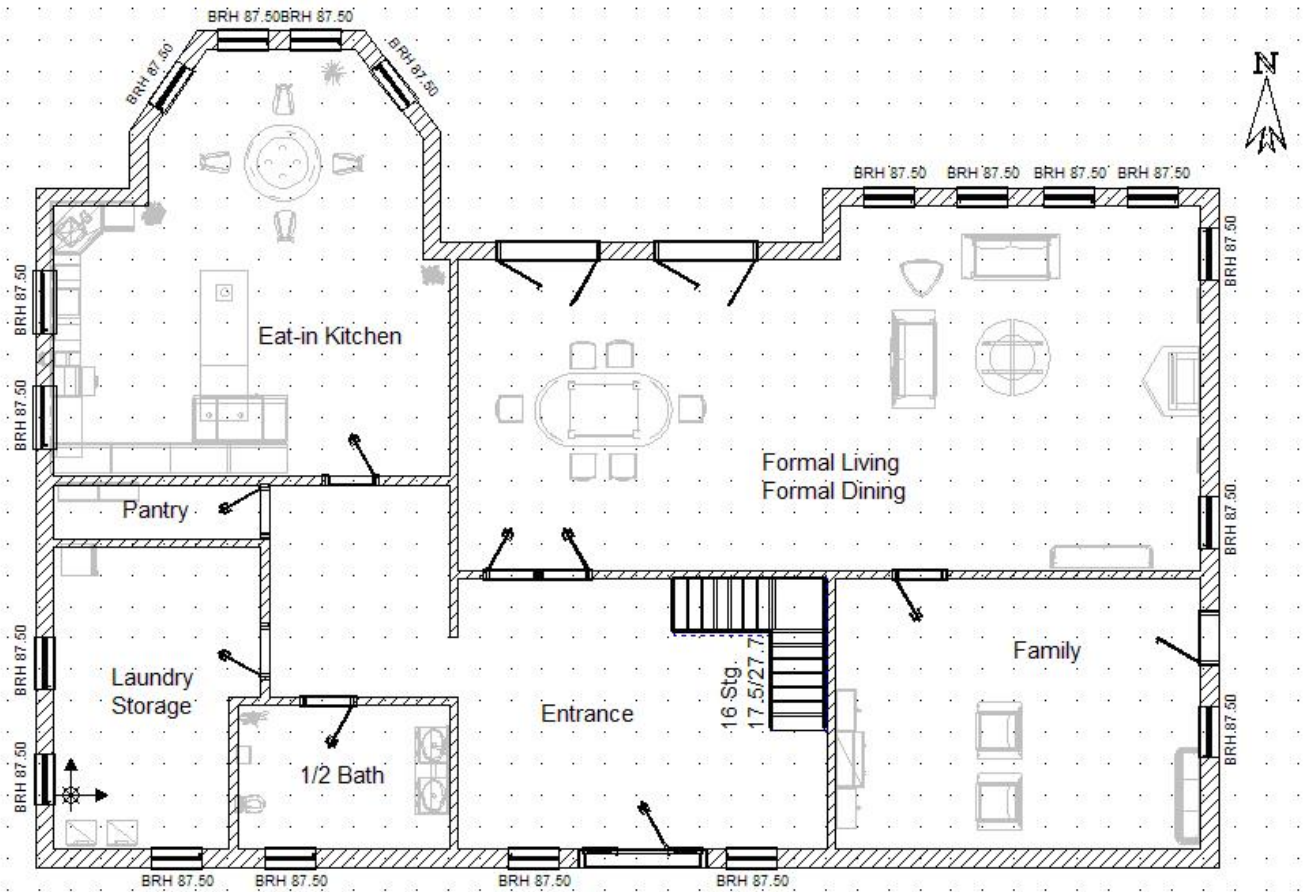


Fig 3.2: Sample main floor plan for a single-family detached home

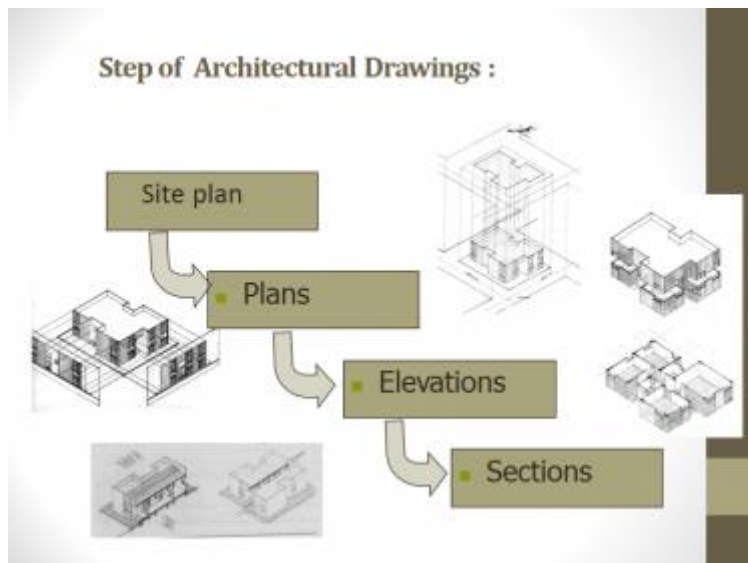


Fig 3.3: Architectural drawings

Foundation plan:



Foundation plan is a drawing showing the site & configuration of the floor plan. It is a drawing that shows the location of foundation wall concrete footings that shows the location of foundation wall concrete footings etc. which are required to support a structure.

Foundation plan shows the entire foundation system at a back fill finished, the foundation wall footings, grade beams & any sub structure elements. It has the same scale to the floor plan. Foundation plan show:

- Foundation wall thickness.
- Position at which detailed of foundation taken.
- Position of wall relative to foundation.
- Position of services to be installed below ground level.
- Grid lines.
- level for excavation.
- Dimension.
- Footing, grade beam.

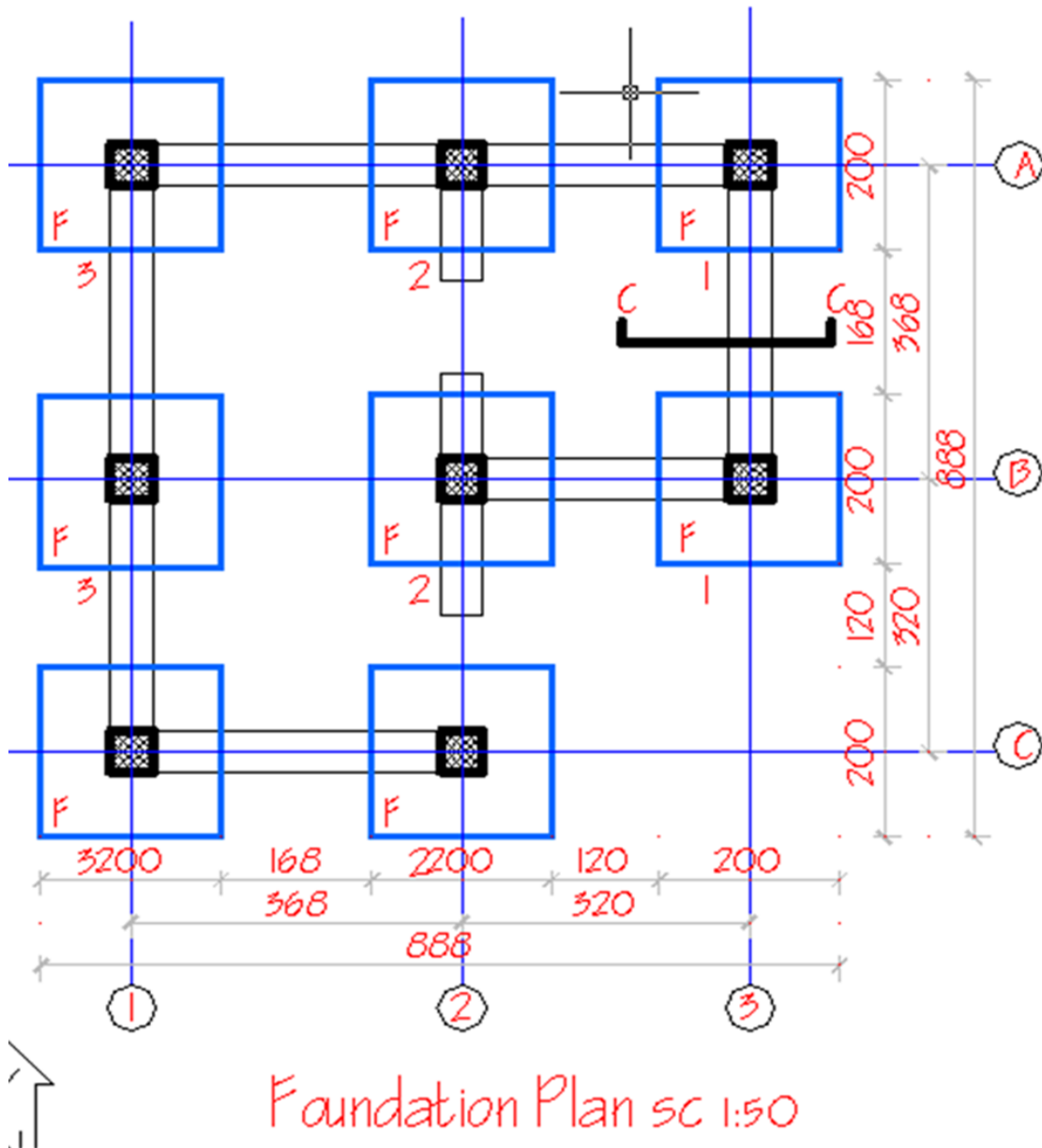


Fig 3.4: foundation plan

- **Detailed Amendment Drawings**

All changes to the drawings shall be explained, in detail, in either the drawing amendment or remarks section of the amendment paper. A marked-up copy of any amended drawing figure, including annotations indicating the changes made, may be included.

Amendments of the drawings are permitted, as well as of the other documents. These amendments may be made at the request of the party concerned or at the request of the EPO. The amendments may concern either clerical errors or more substantial



changes. Amendments to drawings are, in general, subject to the same rules as apply in respect of amendments to other application documents

3.2. Construction Information

Site information for design and construction: Site information refers to information about a proposed site for a development that might be relevant to the consultant team, contractor or operators of the completed development.

This could include information about:

<ul style="list-style-type: none"> • Existing uses. • Existing drawings. • Site availability. • Boundaries. • Covenants, easements, rights of way and rights to light. • Site history. • Land registry drawings. • Planning history. • Legal searches. • Insurance details. • Flood risk. • Natural drainage. • Known hazards. • Contamination. • Information about neighbors and party wall issues. • Key views. • Pedestrian and vehicular access, roads and rights of way. • Local transport facilities. • Traffic surveys. 	<ul style="list-style-type: none"> • Site access conditions. • Information about existing buildings and property condition. • Information about existing services and statutory utilities (such as capacities). • Information about tunnels, wells or other underground obstructions. • Leases. • Ownership issues. • Parking restrictions and allowances. • Existing planning consents, likely planning conditions and the likelihood of requiring an environmental impact assessment. • Waste storage and collection. • Biodiversity and protected species. • Trees and hedges (including tree preservation orders). • Hours of operation. • Potential for phasing. • Local amenities. • Legislative constraints. • Existing policies (environmental policies).
---	---



Wherever possible, any information prepared or obtained should be in a format which can be readily shared and used, and should be stored and named in a way consistent with the long-term project and operational needs.

3.2.1. Pre-construction information:

The 2015 Construction (Design and Management) Regulations require that construction clients provide pre-construction information as soon as is practicable to every designer and contractor appointed, or being considered for appointment, to the project. The regulations define pre-construction information as 'information in the client's possession or which is reasonably obtainable by or on behalf of the client, which is relevant to the construction work and is of an appropriate level of detail and proportionate to the risks involved, including information about:

- The project.
- Planning and management of the project.
- Health and safety hazards, including design and construction hazards and how they will be addressed.
- Information in any existing health and safety file'.

Pre-construction information might include:

- A description of the project.
- Key dates.
- Contact details for the project team.
- The extent and location of existing information.
- Project arrangements:
- Safety hazards.
- Health hazards.
- Significant design and construction hazards
- A description of the format of the Health and Safety File & any relating conditions

**Self-Check -3****Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What should a floor plan include? write at least four from them. (5 points)
2. List three from pre-construction information. (5 points)

Note: Satisfactory rating - 5 and 5 points

Unsatisfactory - below 5 and 5 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Answer key LG14

Self-Check -1

Question #:

1. C. section plan
2. A. Architectural drawing

Self-Check -2

Question #:

1. B) HVAC system drawing
2. components of structural drawing:
 - Steel building drawing
 - Joist connection drawings
 - Rebar shop drawings
 - Anchor-Bolt Drawings
 - Structural Analysis

Self-Check -3

Question #:

1. measurements, furniture, appliances, etc.
2. Pre-construction information might include:
 - A description of the project,
 - Key dates.
 - Contact details for the project team.
 - The extent and location of existing information.
 - Project arrangements:
 - Safety hazards.
 - Health hazards.
 - Significant design and construction hazards
 - A description of the format of the Health and Safety File & any relating conditions



List of Reference

- 1) <https://www.polytechnichub.com>
- 2) www.northbrook.il.us
- 3) <https://en.wikipedia.org>
- 4) <https://theconstructor.org>
- 5) <https://civilseek.com/>
- 6) <http://www.fao.org/3/x5744e/x5744e08.htm>
- 7) <https://www.autodesk.com>
- 8) <https://www.teslaoutsourcingservices.com>
- 9) Architectural Drawings: a Manual: October 2018
- 10) Architectural and Building Drawing Practice A.S. No. CA.25 – 1955 (Standards Association of Australia, Sydney 1955)
- 11) Kicklighter, Clois E., Ronald J. Baird, and Joan C. Kicklighter. Architecture: Residential Drawing and Design. South Holland, IL: Goodheart-Willcox, 1995.
- 12) Working Drawings Handbook, Fourth Edition, Keith Styles and Andrew Bichard, 2004.
- 13) Read And Interpret Plans And Specifications, Certificate Ii In Building And Construction (Pathway – Paraprofessional) Cpcccm2001a, Learner’s Guide, 2012.
- 14) Engineering working drawing basics, Lecture note by: Dr. Ala Hijazi, 2013.
- 15) https://www.designingbuildings.co.uk/wiki/Technical_drawing
- 16) Textbook of, Engineering Drawing, Second Edition, K. Venkata Reddy, 2008.
- 17) Working Drawings Handbook, Fourth Edition, Keith Styles and Andrew Bichard



Prepared by: The trainers (who developed this outcome-based curriculum and TTLM)

N0	Name	Qualification	Region	E.mail
1	Tesfaye Assegidew	MSc in CoTM	SNNPR	tesfayeeassegidew@gmail.com
2	Habtamu Wendmagegn	BSc in Civil Engineering	Dire Dawa	Joniyitna9@gmail.com
3	Yazachew Geneti	MSc in CoTM	BGRS	0917858176
4	Gebresilasie Jemal	BSc in Construction Technology	Addis Abeba	Gebrajemal@gmail.com
5	Getachew Mohammed	MSc in CoTM	Amhara	Gerimom07@gmail.com
6	Kibryisfaw Tulema	BSc in Construction Technology	Somalie	kibrutulema@gmail.com

The coordinator (during developing this *outcome-based* curriculum & TTLM)

No	Name	Profession	Mob. no	Region	College
1	Abere Dagneu	Cur. Expert	0918 01 41 11	Amhara	
2	Abdulahi Muktar	Health officer	0994 86 11 36	Somalie	
3	Tilahun Tesfaye	Cur. Expert	0940 65 18 23	Amhara	