Finishing Construction Work Level II

Learning Guide-10

Unit of Competence: Use Maps, Plans, Drawings And Specifications

Module Title: Using Maps, Plans, Drawings And Specifications

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LO 1: Interpret maps, plans and drawings

Instruction Sheet	Learning Guide 10

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

1.1 Identifying and using types of mapping, planning, drawing and specifications

1.2 Explaining and identifying. *Key features of maps and site plans.*

1.3 Identifying and controlling Environmental requirements.

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 and use ***types of maps***, ***plans and drawings and specifications*** to support work tasks.
- Identify and explain ***Key features of maps and site plans*** and commonly used symbols and check and interpret abbreviations and Functions of the legend. Check and explain Natural and man-made features on maps, plans and drawings.
- Identify Environmental requirements and controls job plans, specifications and environmental plan.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information “Sheet
4. Accomplish the “Self-check

Information Sheet-1	Identifying and using types of mapping, planning, drawing and specifications

1.1 Identifying and using types of mapping, planning, drawing and specifications to support work tasks.

What is a map?

A map is simply a drawing or picture of a landscape or location. Maps usually show the landscape as it would be seen from above, looking directly down.

As well as showing the landscape of an area, maps will often show other features such as roads, rivers, buildings, trees and lakes

A map can allow you to accurately plan a journey, giving a good idea of landmarks and features you will pass along the route, as well as how far you will be travelling.

Plan view – a view from above, looking down

A plan view shows the layout of the proposed building or the site. It can show the length and width of things (for example, rooms) and where things are positioned.

A plan view could be a plan of:

- The block of land the building is to be built on – a site plan
- Just the building itself – a floor plan

•specific parts of the building (that might also be shown on a floor plan); for example, an electrical plan showing positions of lights etc.

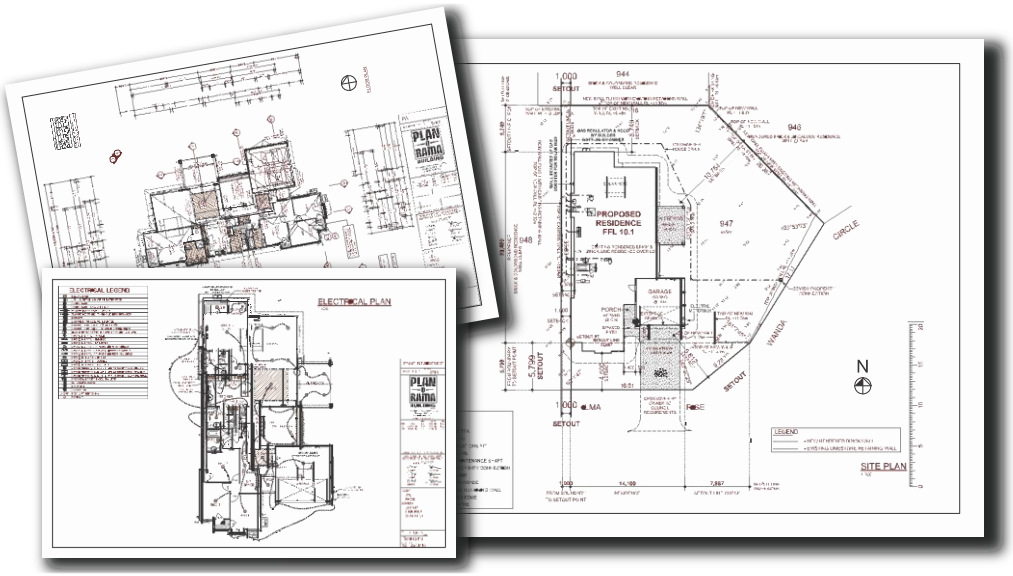

Fig1. Plan

1.1.1. Urban and rural topographical maps.

A topographic map describes a place for a long time; they have been used for military purposes but are now used as well by the public and as a background for spatial planning and other official uses.

Topographic maps are produced at many scales and in many different designs.

A topographic map at the original scale of1:50,000.The map shows the village where the author of this chapter lives.

The topographic maps produced by the National

Mapping Organizations (NMO) is normally called official maps. Nowadays, map production is combined with building geographical databases, which are regularly updated.

The most common topographic map for rural areas is a map at the scale of 1:25,000 or 1:50,000; in urban areas a map at a scale of 1:10,000 is normally called a city map or city plan. All those maps are very good for finding your way. That might be for hiking, berry picking or searching for mushrooms, or finding the route to a museum. In many countries, the rural maps are produced and sold by the NMO and the city maps by each municipality.

All maps pictured on this page can be used for planning purposes and as background for other maps. However, in many countries, topographic maps at the scales of 1:25,000 to 1:100,000 also depict military objects and for that purpose these maps have been restricted from public use. In most countries, military objects are overlaid to a special military version that can be restricted, and the topographic map is free for public use.

1.1.2. Site plans and elevations.

Site plan is comprehensive detailed drawing of the building or an apartment representing whole plan of a building. It shows property boundaries and means of access to the site and nearby structures if they are relevant to the design.

For a construction project, the site plan also needs to show all the services connections like drainage and sewer lines, water supply, electrical and communications cables, exterior lighting etc.

Fig2.floorplan

It's a first design that is made for any project before going into detailing process. Drawing up a site plan is a tool for deciding both the site layout and the size and orientation of proposed new buildings.

These drawings should comply with the local development codes, including restrictions on historical sites. It acts as a legal agreement for the permission of construction from the government body. For this, it is required that the site plan is made by a licensed professional like architect, engineer, landscape architect or land surveyor.

Check list – Site plan show: -

1. Property lines: - Length each side, direction
2. Adjoining building, streets, sides walk, parking, curbs, and prakingways
3. Existing structures and proposed structure.
4. All utility lines (Sewer, Electricity, Telephone)
5. Contours, existing and new: contour elevations
6. Dimension
   - Property lines

- Side yards, pear, front yard
- Street center line
- Length of walks and walls
- Dimension of building to property line.

7. Fences, structural retaining walls, area ways and poles.
8. North arrow
9. Drainage lines
10. All existing paving whether to remain or be removed: new paving, parking lots, steps, platforms, signs, play fields, fountains etc.
11. Trees, shrubs if exist
12. Legend showing all symbols and material used on the site.

- ✓ process flow sheets
- ✓ survey plans
- ✓ **sectional plans and elevations**

Section: - Geometrically, a cross section is a horizontal orthographic projection of a building on to a vertical plane cutting through the building. Cross section is vertical cut section of any building which shows the details of dimension, thickness of any component of a building. It also represents the sill height, lintel height, floor height and other minute details of a structure

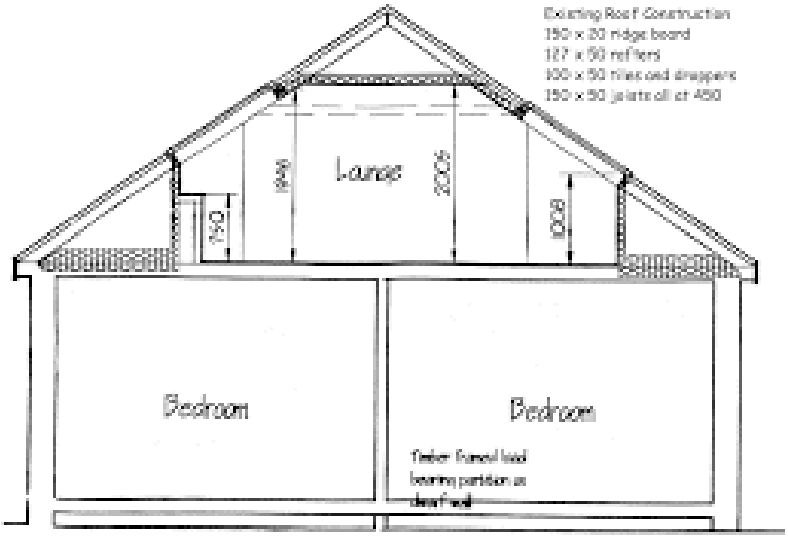

Fig3.elevationplan

The section plane where the plan is vertically cut is represented in the 2d floor plan by a bold dotted straight line.

Elevation: - An elevation shows the proposed building as viewed by someone standing on the ground, looking straight at the building. Usually an elevation drawing is done for each side of the building, so for a typical house there will be four, but a hexagonal house would require six elevations.

An elevation drawing is an orthographic projection drawing that shows one side of the house. The purpose of an elevation drawing is to show the finished appearance of a given side of the house and furnish vertical height dimensions. Majorly it is divided into 3 types,

1. External Elevation

Exterior elevation is the outside representation of a building. It consists of details of type of finish, floor height and projections if any.

Exterior elevations can be 2D or 3D drawings. 2D drawings typically have measurements on them, showing where the relationship between exterior elements likes doors and lights. 2D elevations also can have callouts to different kinds of bricks, stones, and paints, so you know exactly where each material needs to go. 3D exterior renderings are similar to their 2D counterparts, except they focus entirely on the visual. Most of the time, a rendering is a concept drawing to take to whoever is constructing your project to give them an idea of what you want the exterior to look like. From the concept, they'll create the detailed exterior elevation they need to build from.

2. Internal Elevation

Interior elevations are very similar to exterior elevations in purpose. Elevations are extremely useful when constructing a room such as a kitchen or bathroom, which require visualization of built in elements.

Fig4. Internal Elevation

Usually interior elevations are made in 3D that shows your furniture in your space. The inner elevation affects a lot on the living condition and peaceful mind. These days great importance is given to interior elevation than exterior elevation. Interior elevation has the paint color, lightning types, and furniture design and floor patterns.

Landscape Plans

A perfect home or a building has a lush green garden adjacent to it, which enhances the beauty or aesthetics appearance of the building. Hiring a landscape architect for the beautification of houses is trending now a days.

Fig5. Landscape Plans

On landscape plans, you'll see everything from flowers to sidewalks and lawn decorations to fountains. It majorly consists of sidewalks, plantations and other decorative features that can enhance the living area.

Floor Plan

A plan means, top view of any building or object. Floor plan is the most fundamental architectural diagram, a view from above showing the arrangement of spaces in building in the same way as a map, but showing the arrangement at a particular level of a building.

Floor plan view is defined as a vertical orthographic projection of an object on to a horizontal plane cutting through the building. This shows the walls, windows, door and other features such as stairs, fittings and even furniture too.

Fig6. 2D **Floor Plan**

Floor plan is usually given in 2D form, which has all the measurements and detailing. Now a days for a better understanding and conceptualize the plan prior to the construction, floor plans are made in 3D where one can see how the entire apartment looks with furniture from above, giving you a way to see not only how objects fit in the space, but how specific furniture pieces look together.

Fig7. 3D **Floor Plan**

- ✓ channel drainage plans
- ✓ pipe system plans
- ✓ location of assets plans

1.1.3. Specifications.

- ✓ design information
- ✓ customer requirements,
- ✓ sketches and preliminary layouts

Basic Definitions: Specifications

A **specification** is an explicit set of requirements to be satisfied by a material, product, or service.

“Specifications” is a general term applying to all directions, provisions, and requirements pertaining to the performance of the work and payment for the work.

Specification is defined as the designation or statement by which written instructions are given distinguishing and/or limiting and describing the particular trade of work to be executed. In short specification is a statement of particular instructions of how to execute some task. Specification is one of the contract documents.

Specifications are written based on the prepared design, drawings, general and scientific trends of workmanship, quality expected, equipment involved and materials to

be used for the particular trade of work. The specifications should clearly specify: -

- design and drawing
- Labor employment
- Materials to be used
- Construction method
- Equipments used

Specifications should be clear, concise, and brief descriptions of what is required to execute the proposed trade of work. The information that is needed for building construction is usually conveyed by two basic communication lines. They are:

The drawings (pictorial) and the specifications (written)

In so doing the methods of communication should complement each other and neither should overlap or duplicate the other. Specifications are devices for organizing the information depicted on the drawings and they are written descriptions of the legal and technical requirements forming the contract documents.

Self-Check -1	Written Test

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

Instruction1:-Write the answer for the following questions properly

1) What is *plans?(5points)*
2) What is the purpose of an elevation drawing?(5points)

Note: **Satisfactory rating - 5 and 10 points** **Unsatisfactory - below 5**

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Information Sheet-2	Explaining and identifying. *Key features of maps and site plans*

1.2. Key features of maps and site plans.

Site plans

A site plan shows the entire block of land, or at least the part of the block where the building will be. They are drawn at a small scale so that all the required information fits on the sheet. Site plans shows existing features such as trees or other structures that may already be on the site. Site plans also show information like:

• Boundaries

• North point

• Contour lines

• Proposed building outline

• Datum point.

We will explore these later in the unit.

They also typically show things like:

• Driveways and paths

• Fences

• Retaining walls

• Clothes lines.

Key to site plan

1. Block identification. When land is subdivided, each block is given a lot number. The street number is allocated later.

1. Boundary. The boundary is the imaginary line that defines the block of land. At each corner is a small wooden peg with the numbers of the adjacent lots stamped onto a metal plate. If a boundary changes direction, a peg is located at that point too.
2. Road identification. The name of the road shows where the front of the block is.
3. Verge. The verge is the area of land between the block and the road. It is not part of the block and must not be built on (apart from a crossover) or damaged in any way. It usually has services running beneath it (water, telephone, etc).

4. North point. The direction of north is shown to assist in orientating the drawing with the block when on site.
5. Proposed building. The location of the proposed house is shown, usually just as an outline.
6. Finished floor level. The level of the finished floor of the house is given.
7. Adjacent properties. The adjacent lot numbers are shown, and sometimes indications of existing structures are given.
8. Existing fences. Any existing boundary fences should be shown.
9. Easement. An easement is a part of the land over which another party has some sort of legal right. In this case, a strip near the rear of the block is an easement for a council storm water line to be laid. It still belongs to the landowner but the council has the right to lay and maintain a storm water pipe there, so no structure is allowed to be built over this area.
10. Existing trees. If there are any features on the block that are to be left undisturbed they are clearly indicated.
11. Contour lines. These are imaginary level lines that indicate the shape of the land (you might have seen these on maps.) In this site plan, they indicate that the land slopes down from the north corner to the south corner.
12. Contour level. This indicates the 'reduced level' of the contour (reduced levels are explained in Section 3 Dimensions of this guide). In this case, they are shown at one-meter intervals, but this varies depending on the steepness of the land.
13. Datum. This is a point on or near the block that all heights for the project are measured from. It is explained more fully in Section 3.
14. Angle of boundary intersection. This indicates at what angle the boundaries meet. It is not always shown, especially if the block has square corners.
15. Location of power connection. This indicates to the electrician where the electrical connection will be made. In this case, the block has underground power, but if overhead lines pass the block, the nearest power pole may be shown.
16. Boundary length. This indicates the length of each boundary.
17. Setback. This is the distance from the front boundary to the nearest part of the building. A minimum distance for this is set by the local authority (council) and varies depending on the zoning of the land.
18. Offset. Similar to the setback, the offset indicates how far from the side boundary the building is to be. There are by-laws regulating the minimum distance for this, mainly to minimize the spread of fire.
19. Driveway. This indicates where and how wide the driveway should be.
20. Crossover. This is the continuation of the driveway across the verge.
21. Path. Any paving included in the contract is shown.

22. Clothes hoist. The position of the clothes hoist is indicated.

- ✓ drainage
- ✓ sewerage
- ✓ water
- ✓ electricity
- ✓ telecommunications
- ✓ dimensions
- ✓ grades of pipelines and channels
- ✓ tree preservation orders
- ✓ geographical features
- ✓ power and transmission lines
- ✓ heritage and cultural features

1.2.2.types of structures, including:

- ✓ buildings
- ✓ bridges
- ✓ fabricated towers
- ✓ fences
- ✓ pipelines
- ✓ regulators
- ✓ poles
- ✓ environmental barriers

- environmental features, including:
  - ✓ fauna and flora habitats
  - ✓ cultural features
  - ✓ heritage features
  - ✓ water catchments
  - ✓ shape of structure and building
  - ✓ service requirements
  - ✓ location of plant and equipment
  - ✓ vertical and horizontal measurements
  - ✓ clearance distance
  - ✓ geological features
  - ✓ service layouts
  - ✓ bore and casing details

Identifying datum

Datum's are theoretically perfect points, lines, and planes.

Datum's exist within a structure of three mutually perpendicular intersecting planes known as a datum reference frame.

A part is oriented and immobilized relative to the three mutually perpendicular planes of the datum reference frame in a selected order of precedence.

Since measurements cannot be made from theoretical surfaces, datum's are assumed to exist in and be simulated by the processing equipment.

Datum's are specified in order of precedence as they appear in the feature control frame.

Datum features are selected to meet design requirements. Functional surfaces, mating surfaces, readily accessible surfaces, and surfaces of sufficient size to allow repeatable measurements make good datum features.

A datum (Tag) feature symbol is used to identify physical features of a part as datum features. Datum (Tags) feature symbols should NOT be applied to center-lines, center planes, or axes.

Plane, flat-surface features not subject to size variations make the best datum's.

When a cylinder is specified as a datum, the entire surface of the feature is considered to be the datum feature.

Identifying contours

Contour drawings for construction drawings are used so as the designers can determine the best position of the proposed building horizontally and vertically.

They are usually prepared by surveyors on drawings called detail surveys. As the name implies the purpose of the drawing is to detail the features of the site such as,

- Direction of fall of the land
- Location of Trees
- Location of existing structures
- Location of services
- Location of any other features that may affect the design & placement of the building.

Understanding Contours

Contours Lines - are imaginary lines that joint points of the same height above the datum (points of equal elevation. They allow a person viewing the plan which is 2 dimensional to form an impression of its 3 dimensional shape.

It is important that the contours refer to a datum so as construction based on the design will be built at the appropriate height.

Contours – The most common way of showing the shape of the ground on modern maps is by the use of contour lines. Contour lines give no visual illusion of relief and failure to recognize this may cause difficulty in understanding their purpose.

(1) SIMPLE PRINCIPLE – The concept of a contour is very simple. It is an imaginary line drawn on a map, joining all places of equal height above fixed datum line (usually sea level).

(2) CONTOUR HEIGHTS – On the map, each contour is drawn at a specific height above a fixed datum and the vertical distance represented by each is the same. The difference in height between contours is called the

Vertical Interval (VI) or the Contour Interval and is shown in the marginal information on the map. It is from the height and spacing of contours that the shape of the ground is deduced and accurately calculated if necessary. Some contours have the height shown at intervals along their length.

Self-Check -1	Written Test

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

Instruction1:-Write the answer for the following questions properly

1) list at last five *types of key to site plans?(12points)*
2) explain *Key features of maps and site plans*?(5points)

Note: **Satisfactory rating - 9 and 17points** **Unsatisfactory - below 9**

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

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

Information Sheet-3	Identifying and controlling Environmental requirements

1.3. Identifying and controlling Environmental requirements.

1.3.1 **Environmental** requirements

Environmental controls and protection requirements are an essential part of every civil construction worksite.

It is essential that you identify the appropriate environmental controls for the project you are working on. They can be found in documents such as:

- Job plans.
- Job specifications.
- Environmental plans and procedures for the worksite**.**

Environmental controls are those specifications and requirements that are used onsite to ensure the protection requirement. Environmental controls may be implemented to meet legislative requirements. Environmental controls include: Soil and water management, including clearing and grubbing tasks, erosion and sediment control, drainage management and water licensing.

Waste management

Environmental sensitivity and heritage factors

Air quality

Flora and fauna management, including protected species management

Demolition management, including dust control, noise management, vibration minimisation and blasting requirements

Storm water management

Weed control measures.

Chemical and hazardous substance storage requirements

Other requirement relevant to tasks and activities

The environmental management plans will outline the requirements for each of these issues and other site- specific requirements.

Environmental management

An organizational/project environmental management Pl aims to outline steps and processes required to prevent minimize harm to the environment through the use of machinery and equipment.

Specific environmental management plans will be in place each site and often will relate to specific activities.

Different aspects of the worksite could have different environmental management plans

The plan will also include requirements for the delivery and storage of materials on the site, as well as guidelines for the protection of any trees that may be impacted by the civil construction project.

The Environmental Protection Authority (EPA) will investigate and fine sites that do not meet the state and federal environmental protection arrangements that are in place for all civil construction projects.

If you have concerns or questions about the exact requirements you must meet, speak with your supervisor or the environmental officer.

Environmental protection policies

Relevant principles of this act, which could impact on the contract, include:

- That pollution and degradation of the environment must be avoided or, where they cannot be altogether avoided, are kept to a minimum and corrected.
- The waste is avoided, or where it cannot be altogether avoided, minimized.
- The negative impacts of the contract, on the environment and the people in the environment, are prevented and where they cannot be altogether prevented, are kept to a minimum and corrected.

Construction

Construction activities, or actions which could impact negatively on the environment and therefore be a transgression of the above acts, include:

- Pollution of water source
- Soil pollution

Pollution of water sources

At water points – by destroying the river banks, vegetation and contamination by workers.
When disposing of left-over bituminous binders, cement, oil/lubricants and other construction products, spillage or inappropriate and clumsy usage or handling of these materials.
When washing and cleaning of equipment.

Contamination by workers.
Contamination due to construction activities e.g. gravel and spoil in water courses..

- **Environmental protection requirements**

Relevant principles of this act, which could impact on the contract, include:

That pollution and degradation of the environment must be avoided or, where they cannot be altogether avoided, are kept to a minimum and corrected.

That waste is avoided, or where it cannot be altogether avoided, minimized.

That negative impacts of the contract, on the environment and the people in the environment, are prevented and where they cannot be altogether prevented, are kept to a minimum and corrected.

absence of mitigation construction and operations activities

The following construction and operations activities as having potential, in the absence of mitigation, to result in the introduction of deleterious substances (contaminated runoff) into the River:

Hazardous materials spill in the vicinity of the river/marsh during the course of roadway construction.

Release of re-suspended, contaminated bottom sediments during the course of construction of roadway embankment over Riel Pond

During operation, introduction of contaminants (deleterious substances) into the River Marsh as a result of discharge of roadway/bridge runoff from storm water management facilities.

During operation, release of hazardous materials as result of a spill associated with a vehicular accident on the roadway, bridge deck or approaches.

During operation, introduction of contaminants (deleterious substances) into the Sturgeon River/Riel Marsh as a result of roadway/bridge maintenance procedures

The above-described environmental protection measures will achieve the following:

- Minimization of the potential for hazardous materials spills to occur during construction
- Minimization of the potential for any spill occurring during construction or operation to reach the Sturgeon River or Riel Marsh.
- Minimization of the volume of spilled material that could reach the Sturgeon River or Riel Marsh during construction.

- Minimization of the risk that spilled material could pose to water quality or aquatic organisms.
- Minimization of the volume of hazardous materials that could reach the Sturgeon River or Riel Marsh in the event of a spill resulting from a vehicular accident during roadway operation.
- Establishment of clear emergency response plans that ensure speedy and effective clean-up of any spills that do occur during construction or operation and full compliance with all spill reporting guidelines and regulations.
- Minimization of potential for the introduction of deleterious substances as a result of roadway/bridge maintenance procedures The measures discussed above adhere to existing best management practices for roadway/bridge maintenance.

protecting and preserving environmental resources

The following are guidelines for fulfilling the responsibility for protecting and preserving various environmental resources during construction as required by law:

Archeological and Historical Resources

Mitigating a project's impact on historical and archaeological sites during construction may require the recovery of artifacts. Mitigation may also require Native Americans, archeologists, architects, and historians to monitor and coordinate the recovery process. Normally, archaeological work is done in advance of construction, but occasionally, finds are made during construction. If human remains or previously unknown historic and archaeological artifacts are unearthed, suspend work in the vicinity until the find can be evaluated and properly treated.

Endangered Species

Both state and federal laws are designed to protect designated plant and animal species along with their respective habitats. As a result, often very strict prohibitions exist on certain types of work, work during certain times of the year, or work at specific locations. Even inadvertently impacting protected species can result in fines or jail sentences. The contract will specify the necessary measures and restrictions and the plans will show environmentally sensitive areas. However, during construction, project crews may discover protected species that were not anticipated in the contract. If such a discovery occurs, suspend work in the area and immediately notify the district environmental unit.

Migratory Bird Act

The Migratory Bird Act makes it illegal to interfere with migratory birds. Breeding and nesting seasons for these species can result in strict prohibitions or require working around nesting areas. The act may require avoidance or prohibit disturbance of many species of

birds, such as swallows that roost or nest under highway structures. Should occupied nests be found, suspend work in the nests' vicinity until the birds abandon the nests.

Erosion

The rehabilitated drainage system should be sufficient to minimize the risk of erosion. The principle of "little and often" should guide the arrangements for discharge of rainwater from the road margins. Any new earthworks will have a potential to create unstable slope situations. Quarries should be developed and reinstated so that erosion risks are minimized.

Siltation

Siltation often occurs at drainage outlets, particularly where culverts have been incorrectly installed. This can cause ongoing siltation problems on adjacent productive agricultural land. The rehabilitation works should include the rebuilding of culverts previously causing siltation so that this problem is removed.

Tree Removal

Where trees are removed for the road rehabilitation or bridgeworks, arrangements should be made to plant replacement trees and also for any future timber requirements for replacement of bridge decking etc. Care must be taken to ensure that tree or vegetation removal will not lead to erosion or slope stability problems.

Gravel Reserves

Gravel surfacing is worn away by the effects of traffic and weather. Natural gravel reserves are a finite resource. They can only be used once. Depletion of resources will deprive future generations of their availability and will result in future increasing haul distances. The choice of surfacing should consider the consequences of present resource use and any policy directives on use and depletion of local mineral resources.

Dust

The further environmental (and social) issue with regard to unpaved roads is that of the dust pollution for the people who are living adjacent to the road (and their property). This can lead to cleanliness and health problems.

Dust generation also causes a further social and economic concern. Dust can cause a severe safety hazard for road users, particularly for overtaking movements and in villages.

Self-Check -4	Written Test

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

PART I MULTIPLE CHOICE

Choose the correct answer for the following questions from the given alternatives

1._____ is **essential that you identify the appropriate environmental controls for the project you are working on**. (2points)

A. plan C. **Job specifications**

B. **Environmental plans and procedures for the worksite**

D. all of the above

2. Which one of the following is not a source of Pollution of water? (2points)

A. When washing and cleaning of equipment

B. Contamination by workers

C. Contamination due to construction activities e.g. gravel and spoil in water courses

D. None

Note: **Satisfactory rating - 2 and 4 points** **Unsatisfactory - below 2**

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

Answer Sheet

Score = _____

Rating: _____

Answer keys for learning guide -99

Self check 1

1. A plan view shows the layout of the proposed building or the site

2. To show the finished appearance of a given side of the house and furnish vertical height dimensions.

Self check 2

1.

- ✓ Boundary
- ✓ Road identification
- ✓ North point
- ✓ Proposed building
- ✓ Existing trees
- ✓ Contour lines
- ✓ Datum
- ✓ Setback.etc

2. Site plans shows existing features such as trees or other structures that may already be on the site.

Self check 3

1. D
2. D