



Ethiopian TVET-System



Irrigation and Drainage Designing and Construction NTQF Level III

Based on June, 2017 G.C. Occupational Standard

**Module Title: Monitoring Implementation of
Environmental Procedure**

TTLM Code: EIS IDDC3 TTLM 0920V2



This module includes the following Learning Guides

LG31: Assess the environmental requirements of a specific project or site.

LG Code: EIS IDD3 M09LO1-LG-31

LG32: Implement environmental procedures

LG Code: EIS IDD3 M09LO2-LG-32

LG33: Report and review the application of environmental procedures.

LG Code: EIS IDD3 M09LO3-LG-33

Instruction Sheet	Learning Guide-31: Assess the environmental requirements of a specific project or site.
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Site-specific environmental issues
- Environmental risks and impacts
- Relating environmental procedures and environmental risks

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 –

- Site-specific environmental issues
- Environmental risks and impacts
- Relate environmental procedures and environmental risks

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 4.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4” in page 4, 8, and 11 respectively.
4. Accomplish the “Self-check 1, Self-check 2, Self-check 3 and Self-check 4” -” in page 7, 10 and 15 respectively
5. If you accomplish the self-checks, do operation sheet in page 41 and 42
6. LAP Test in page 43

Information sheet-1	Site-specific environmental issues
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1.1. Site-specific environmental issues

The term ‘environment’ is used to describe our surroundings – both the natural physical surroundings such as the land, water, climate, plants and animals that we can see, and the places in which we live with their social, cultural, economic and spiritual dynamics (usually called the human environment). This book focuses on the natural physical environment – the way in which our practices and lifestyles affect it, and the ways in which it affects our lives.

People depend on the natural environment for survival. Our food, medicines, shelter, fuels and clothing are all sourced from it. For example, a farmer’s crop relies on adequate water, sunshine, fertile soil, unpolluted air and soil, and balanced insect life and micro-organisms.

Without any one of these, the crop is threatened and the farmer may not have enough food to feed the family or to sell in the market.

People in urban areas also depend on the environment but perhaps in a less direct way. Their food may come indirectly through markets and shops. They usually buy rather than collect fuel for cooking. Manufactured products rely on the environment for:

- the raw materials such as wood or plant fibers
- energy – usually from fossil fuels such as oil or diesel, to work the machinery
- water – factories often use a lot of water for manufacturing processes
- Transport – over land by road and rail, across oceans or along rivers to customers.

Environmental issues in the workplace are a growing concern for companies, especially as it relates to employee health and safety. Bad air quality and ventilation as well as broken asbestos structures can lead to sick building syndrome, which can compromise the health and comfort of your employees. Not only can poor workplace environments

reduce productivity, but research has shown they may be linked to asthma, lung cancer and other medical problems.

The environment you work in can have an impact on how well you do your job and how well you feel. Working in a safe, comfortable environment helps to keep you focused on what's important: doing your job. But if your work environment causes stress or makes you feel ill, you're likely to focus more on what's causing the discomfort than working.

A. Stress

A high-stress work environment can lead to health problems and work errors. These issues are compounded if employees feel pressured into skipping vacations or working through illnesses rather than taking sick days. Fatigue and frustration can set in, reducing the quality of work getting done. Safety can also be affected when mistakes become accidents. It's not just the employees who suffer from high-stress environments. Their employers are also impacted. Companies in which stress-related problems are a cultural norm could suffer financially from poor-quality work and high rates of employee turnover.

B. Air Quality

Poor air quality isn't just a problem in manufacturing or heavy-duty work sites that emit pollutants. Office buildings that are sealed up tight and rely on air circulation systems can end up circulating viruses, molds, allergens and even gases or residue from toxic cleaning chemicals. Environments with low humidity levels contribute to sinus and dry eye issues, while high humidity introduces biological pollutants. As with a high-stress environment, a work environment with poor air quality can affect the health of employees and, subsequently, their quality of work.

C. Noise

A noisy work environment can cause headaches in the short term. Repeated exposure over a long period of time can lead to hearing loss and heart disease. As with a high-stress environment, employees can find it hard to concentrate when noise levels reach

the point where normal conversation becomes difficult, and the quality of work being done can suffer as a result.

D. Ergonomics

Insufficient lighting and uncomfortable desk chairs are examples of workplace ergonomics that can lead to health problems, fatigue and reduced productivity and work quality. Poor lighting causes eye strain and can also affect employee decision making. If an employee must visually inspect products, poor lighting can lead to judging a bad product good or a good product bad. Uncomfortable desk chairs can lead to poor posture and the development of musculoskeletal disorders, which could increase health care costs and employee absenteeism.

Environmental issues in the workplace are a growing concern for companies, especially as it relates to employee health and safety. Bad air quality and ventilation as well as asbestos-riddled structures can lead to sick building syndrome, which can compromise the health and comfort of your employees. Not only can poor workplace environments reduce productivity, but research has shown they may be linked to asthma, lung cancer and other medical problems.

Employers need to take affirmative steps to ensure the health and welfare of their workers. Confronting the problem makes business sense by way of health management savings as well as low absenteeism and contained insurance premiums. To make sure they are in compliance, employers should consult EPA and OSHA guidelines and follow directives. If necessary, consult an environmental consultant to determine cost-effective ways to handle workplace environment issues. Here are things that you as an employer can do to combat health issues in the workplace:

- Consult governmental guidelines to ensure compliance and reduce risk exposure.
- Hire an environmental consultant to manage workplace environmental issues.
- Train your employees about work environmental issues.

Self-Check 1	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. List at least five environmental issues related to employee health and safety in construction site. (5 points)
2. What are the major causes of water pollution? (5 points)

Score = _____
Rating: _____

Answer sheet

1. _____
2. _____

Name: _____ Date: _____

Note: Satisfactory rating - 5 point Unsatisfactory - below 5 points
You can ask your trainer for the copy of the correct answers.

Information sheet-2	Environmental risks and impacts
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1.2. Environmental risks and impacts

An environmental impact is defined as any change to the environment, whether adverse or beneficial, resulting from a facility’s activities, products, or services. In other words, it is the effect that people's actions have on the environment. For example, when volatile organic compounds are released into the environment, the effect or impact is pollution in the form of smog, in this case being negative. It can go the other way, as a person picking up litter can have a beneficial impact on the local environment.



Figure1:A deforested hill in Burma, as a result of resource and energy demand.

The primary impacts of concern in an energy dependent society often come as a result of our energy use. Burning hydrocarbons like coal and oil to provide us with useful energy results in the emission of carbon dioxide and other pollutants. Other activities causing harm include improper waste disposal to bodies of water and soil, accidental spills of chemicals, increased demand for resources as populations increase (especially due to consumerism), and much more.

The impacts that these have on the environment have become clear and include:

- Climate change including Global warming

- Acid rain, photochemical smog and other forms of pollution
- Ocean acidification
- Displacement/extinction of wildlife
- Resource depletion - forests, water, food
- and more

There are many issues in the world that are causing one or more of these effects. The oil sands, for instance, are of great concern to many these days as they essentially contribute to each of the above impacts, see environmental impacts of oil sands.

For information on how the average person may be affecting the environment, visit CO2 footprint and anthropogenic effects.

1.2.1 Assessing Impacts

The environmental impact a specific action may have can be analyzed using a lifecycle assessment, which is the process of observing a product from its "cradle to grave" and determining the impacts associated with it at each step. These methods are somewhat subjective and resource intensive.

- **Emission inventories** for example may quantify the emission of pollutants, while **risk assessments** can analyze the effects these pollutants will have on the health of those within the environment.
- **Process hazard analysis** involves identifying and assessing potential impacts of unplanned hazardous materials. A team may rank the possible hazards and focus on preventing those that can cause the most harm.

Self-Check 2	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write the impact on the environment due to improper waste disposal to bodies of water and soil, accidental spills of chemicals (10 points)

Answer sheet

1. _____

Score = _____ Rating: _____

Name: _____ Date: _____

Note: Satisfactory rating - 5 point Unsatisfactory - below 5 points
You can ask your trainer for the copy of the correct answers.

Information sheet-3	Relating environmental procedures and environmental risks
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1.3. Relating environmental procedures and environmental risks

1.3.1. Climate-related and environmental risks

Climate change and environmental degradation are sources of structural change that affect economic activity and, in turn, the financial system. Climate-related and environmental risks are commonly understood to comprise two main risk drivers:

Physical risk refers to the financial impact of a changing climate, including more frequent extreme weather events and gradual changes in climate, as well as of environmental degradation, such as air, water and land pollution, water stress, biodiversity loss and deforestation. Physical risk is therefore categorized as “acute” when it arises from extreme events, such as droughts, floods and storms, and “chronic” when it arises from progressive shifts, such as increasing temperatures, sea-level rises, water stress, biodiversity loss and resource scarcity. This can directly result in, for example, damage to property or reduced productivity, or indirectly lead to subsequent events, such as the disruption of supply chains.

Transition risk refers to an institution’s financial loss that can result, directly or indirectly, from the process of adjustment towards a lower-carbon and more environmentally sustainable economy. This could be triggered, for example, by a relatively abrupt adoption of climate and environmental policies, technological progress or changes in market sentiment and preferences.

1.3.2. Characteristics of climate-related and environmental risks

Physical and transition risk drivers impact economic activities, which in turn impact the financial system. This impact can occur directly, through

Forexample, lower corporate profitability or the devaluation of assets, or indirectly, through macro-financial changes. In addition, physical and transition risks can trigger

further losses, stemming directly or indirectly from legal claims on the institution – this is commonly referred to as “liability risk” and reputational loss for failing to adequately manage climate-related and environmental risks.

Consequently, physical and transition risks are drivers of prudential risk, in particular credit risk, operational risk, market risk and liquidity risk. These risks also affect the sustainability of the institution’s business model in the medium to longterm, and particularly institutions whose business model is reliant on sectors and markets that are particularly vulnerable to climate-related and environmental risks. The magnitude and distribution of climate-related and environmental risks depend on the level and timing of mitigation measures and whether the transition occurs in an orderly or disorderly fashion. Potential losses stemming from climate-related and environmental risks depend especially on the future adoption of climate-related and environmental policies, technological developments and changes in consumer preferences and market sentiment. Irrespective of this, any combination of physical and transition risks will, in all probability, materialize on the balance sheets of euro area institutions. Existing estimates of adverse long-term macroeconomic effects resulting from climate change point to significant and lasting losses in wealth. These may be due to slowing investment and lower factor productivity in many sectors of the economy, as well as reduced potential GDP growth.

Table 1: Examples of climate-related and environmental risk drivers

Risks affected	Physical		Transition	
	Climate-related	Environmental	Climate-related	Environmental
	<ul style="list-style-type: none"> • Extreme weather events • Chronic weather 	<ul style="list-style-type: none"> • Water stress • Resource scarcity • Biodiversity loss • Pollution • Other 	<ul style="list-style-type: none"> • Policy and regulation • Technology • Market sentiment 	<ul style="list-style-type: none"> • Policy and regulation • Technology • Market sentiment

	patterns			
Credit	The probabilities of default (PD) and loss given default (LGD) of exposures within sectors or geographies vulnerable to physical risk may be impacted, for example, through lower collateral valuations in real estate portfolios as a result of increased flood risk.			Energy efficiency standards may trigger substantial adaptation costs and lower corporate profitability, which may lead to a higher PD as well as lower collateral values.
Market	Severe physical events may lead to shifts in market expectations and could result in sudden reprising, higher volatility and losses in asset values on some markets.			Transition risk drivers may generate an abrupt reprising of securities and derivatives, for example for products associated with industries affected by asset stranding.
Operational	The bank's operations may be disrupted due to physical damage to its property, branches and data centers as a result of extreme weather events.			Changing consumer sentiment regarding climate issues can lead to reputation and liability risks for the bank as a result of scandals caused by the financing of environmentally controversial activities.
Other risk types (liquidity, business model)	Liquidity risk may be affected in the event of clients withdrawing money from their accounts in order to finance damage repairs.			Transition risk drivers may affect the viability of some business lines and lead to strategic risk for specific business models if the necessary adaptation or diversification is not implemented. An abrupt

		reprising of securities may reduce the value of banks' high-quality liquid assets, thereby affecting liquidity buffers.
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Methodologies to estimate the magnitude of climate-related risks for the financial system in general, and banks specifically are rapidly developing. Available estimates suggest that both physical and transition risks are likely to be significant. Although

The majority of studies have focused on climate-related risks in particular, other environmental factors such as water stress, biodiversity loss and resource scarcity have also been shown to drive financial risk.

Climate-related and environmental risks have distinctive characteristics that warrant particular consideration by supervisors and institutions alike. These characteristics include the far-reaching impact in breadth and magnitude, an uncertain and extended time horizon and the dependency on short-term action.

Climate change has a far-reaching impact in terms of the business activities and geographical areas affected. Sectors that are more likely to be physically impacted are, amongst others, agriculture, forestry, fisheries, human health, energy, transport and infrastructure and tourism. Sectors that are likely to be impacted by the transition to a low-carbon economy include energy, transport, manufacturing, construction and agriculture. Geographically; the impact of climate change is expected to vary substantially across the world. The European Environment Agency concludes that, in Europe, the costliest effects in southern Europe are projected to be increases in energy demand and heat waves, in Western Europe coastal flooding and heat waves, in northern Europe coastal and river flooding, and in Eastern Europe River flooding. The impact may differ considerably across given sectors and given geographical areas.

Climate-related risk for euro area institutions is expected to primarily materialize in the medium to long term. As the planning horizon and average loan tenor for institutions is

typically shorter than the time horizon in which the effects of climate change would primarily manifest, it is important for institutions to take a forward-looking approach and consider a longer than usual time horizon. In addition, adopting a forward-looking perspective should enable institutions to be able to respond in a timely manner should

the pace of the transition to a low carbon economy accelerate and projections materialize more rapidly than expected.

Self-Check 3	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Writetwo main types and their description of climate-related and environmental risk.
(6 points)

Answer sheet

1.

Score = _____
Rating: _____

Name: _____ Date: _____

Note: Satisfactory rating - 3 point Unsatisfactory - below3points

You can ask you trainer for the copy of the correct answe3rs.

Instruction Sheet	Learning Guide- 32: Implement environmental procedures
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Planning activities of a specific site
- Managing and Reporting Environmental incidents
- Recording Environmental incidents

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 –

- Plan activities of a specific site
- Manage and Reporting Environmental incidents
- Record environmental incidents

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 4.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4” in page 18, 22 and 26 respectively.
4. Accomplish the “Self-check 1, Self-check 2, Self-check 3 and Self-check 4” -” in page 21, 25 and 28 respectively
5. If you accomplish the self-checks, do operation sheet in page 41 and 42
6. LAP Test in page 43

Information sheet-1	Planning activities of a specific site
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1.1. Planning activities of a specific site

To plan and schedule project activities and tasks the project manager needs to take the next four steps:

- Set up activities.
- Define relationships between activities.
- Estimate resources required for performing activities.
- Estimate durations for activities.

1.1.1. Set up Activities

The first step of project activities planning and scheduling requires the project manager to define what amount of actions and tasks are necessary for producing project deliverables in a timely manner. The input for this process will be the project. The project manager can use this document to define high-level activities that will be used later in creating the project implementation schedule. The project manager should also work on developing project activities templates that help simplify the process of project scheduling and planning.

In cooperation with experts and the project team, the manager should make project activities lists that will be the output of the process for project activities planning and scheduling. For each of the listed activities accurate milestones should be identified and approved. All the identified milestones should be gathered into a single milestones list.

1.1.2 Define Relationships between activities.

The next step for planning project activities and tasks requires the project manager to make a sequence of all the activities identified at the previous step. The manager will use project activities lists, the milestones list and the product to define relationships among the activities. With help of project management software that person can set up priorities for each of the project activities and make task sequences organized and sorted by importance and urgency.

There is also a need to define dependencies between the activities. Dependencies can be internal and external. Activities with internal dependencies refer to any actions that the project team will take to produce the deliverables within the existing working environment. Activities with external dependencies refer to non-project factors that define success of project-related activities.

Both types of activity dependencies should be identified and added to sequenced and prioritized activity lists. Once the relationships are defined, the project manager should update project activities templates, outline the dependencies and link them to the product scope statement.

1.1 3. Estimate Resources

At this step, the project manager needs to review stakeholder requirements and the product scope statement to estimate an amount of resources required for performing project activities and tasks. Also, expert judgments and alternatives analysis should be used for this purpose.

The constraint of time needs to be considered when estimating activity resources. The project manager in cooperation with experts and the team should develop resource calendars and define types of required resources. Once all this information is collected and analyzed, it should be used to make a decomposition of activity resources categorized by types, priorities and time. This decomposition is critical to creating the project implementation schedule.

1.1.4. Estimate Durations

The final step in project activity planning and scheduling requires the project manager to define and estimate an amount of working time required for accomplishing each identified activity. This is about setting up durations for project activities and tasks. Durations will depend on 1) the amount of work effort and 2) available of activity resources.

The project manager should review the resource decomposition and project activities templates to estimate the number of work periods required for completing the identified activities and producing the deliverables. The output of this process is activity estimates that are linked to resource calendars. This information will be used later in developing the implementation schedule.

Self-Check 1	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Prepare sample planning format using above steps. (15points)

Answer sheet

1. _____

Score = _____

Rating:

Name: _____ Date: _____

Note: Satisfactory rating –7.5 point Unsatisfactory - below7.5points

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

Information sheet-2	Managing and Reporting Environmental incidents
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2.2. Managing and Reporting Environmental incidents

2.2.1. Introduction

Environmental incidents must be reported to the competent authority, the Municipality of Maastricht. An environmental incident can include the following events (this list is not exhaustive).

The unintentional release of (chemical) substances to:

- water/sewers (spill in lab, leaking equipment, cleaning or leaking waste fat or oil vessels)
- air (extraction from lab or leakage in cooling equipment)
- soil (oil from motor vehicles or leaking vessels)
- Unpleasant odour
- Noise.

Although accidents are, of course, always undesirable incidents, the term ‘incident’ is reserved here for:

- those arising undesirable situations which (immediately) endanger the safety and/or health of employees
- Those incidents which may have caused an accident under unfavorable circumstances.

Why report?

The incident report form allows you to report abnormal situations within Maastricht University quickly and easily. It is in everyone’s interest to report unsafe situations or near misses and to prevent real accidents. Registration is an important part of this.

2.2.2. Purpose of the procedure for reporting environmental incidents

The purpose of the procedure is to take measures to prevent undesirable events from being repeated. This can also improve risk management:

- by preventing repetition through analysis
- by drawing up or amending instructions (guidelines) to improve prevention
- by gaining insight into the results of the implemented safety measures
- by obtaining an accurate picture of the circumstances of the accident in relation to dealing with claims
- by complying with legal requirements.

The report is most certainly not intended to be used to find out who is 'to blame' for the event (accidents at work, (environmental) incidents and dangerous situations). The point of the report is to be able to find out how Maastricht University can improve its risk management.

2.2.3. The duty to report accidents, incidents and hazardous situations

- **Employee**

It is the duty of every employee to report accidents, near misses and hazardous situations to his/her superior. It the duty of this person to pass these reports on to the prevention officer/occupational health & safety officer of his/her department/unit. Every report, regardless of how minor the consequences are, can have a preventive effect with regard to serious accidents.

- **Employer**

The employer has a duty to report to the district manager of the Labour Inspectorate if:an employee suffers an accident which results in serious physical or psychological injury or death.

Serious physical or psychological injury means:

- admission to a hospital for treatment or observation (not outpatient treatment), or
- (suspected) permanent physical injury, or
- (suspected) permanent psychological injury.

Events such as the above must be reported immediately. At UM these reports are made to the SZW Inspectorate (formerly the Labour Inspectorate) by the occupational health and safety executive.

This duty does not apply to staff employed under the supervision of another organization, which will report in this case.

2.2.4. (Internal) handling of the report in the case of an accident at work subject to a report

Events which are subject to a report as stated above are immediately reported by the occupational health and safety executive to the portfolio holder of the Executive Board and the chair of the crisis coordination team (CT) of the relevant unit.

The occupational health and safety executive:

- Analyses the event
- Completes the report (drafts an accident/incident report) with those involved
- Sends a copy of the report to the parties concerned:
 - ✓ Those involved
 - ✓ The immediate manager or supervisor
 - ✓ The director of the unit
 - ✓ The prevention officer who reports to the relevant emergency response workers HRM and the Staff Representation Office (F or D board)
- Records or archives the report and the accompanying reports in the central archive

The prevention officer:

- Coordinates the measures to be taken following the results of the analysis
- Feeds back to those concerned
- Evaluates the measures taken (for 6 to 8 also see 'registration of accident and incident reporting in the RI&E')

Self-Check 2	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write the purpose of using procedure for reporting environmental incident. (5points)
2. What is necessary conducting environmental incidents reporting. (7points)

Answer sheet

1. _____

2. _____

Score = _____
Rating: _____

Name: _____ Date: _____

Note: Satisfactory rating –6 point Unsatisfactory - below6points
You can ask you trainer for the copy of the correct answers.

3.1 Recorded environmental incidents

3.1.1 The following bodies must registration and recording environmental incidents and accidents

- **Company register**

Registration of accidents, incidents and hazardous situations applies to internal staff and hired personnel (agency workers, trainees etc.). This register must include the details of the reported accidents at work and accidents at work which have led to an absence of more than three working days, and the nature and date of the accident.

- **Risk management**

If an accident has taken place, this means that risk management can be improved. Accidents provide important information which can improve risk management. You can also learn from undesirable incidents which may have led to serious accidents in less favorable circumstances. Therefore, Maastricht University has decided to record such incidents and hazardous situations.

- **Recording in the RI&E**

When writing the RI&E or a progress report arising from it, (at least) a list of accidents is included stating the nature and date of the accident. It is also recommended that you state in the RI&A or progress report the incidents and hazardous situations which have taken place during the year of the report. The report should include at least the following:

- A description of the measures taken in response to accidents and incidents
- A description of the measures taken in response to events involving major material damage
- A list of hazards reported by employees

- A numerical list of the accidents which have taken place within the company and the absence through illness as a result of accidents.

3.1.2 Other recorded environmental incidents

Details of each incident will be recorded on the EPA database for future reference. All complaints and reports will require the following information:

- name, address and daytime telephone number of people making the report
- incident details (please indicate if the incident is still occurring at the time this notification is lodged)
- date and time of incident
- details of source of pollution such as business name, address, etc
- Location of incident (if not the same as address).

Self-Check 3	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write the environmental incident registered and recoding method. (6points)
2. Why registered and recoding environmental incidents. (6 points)

Answer sheet

1 _____

2 _____

Score = _____

Rating:

Name: _____ Date: _____

Note: Satisfactory rating –3 point Unsatisfactory - below 3 points

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

Instruction Sheet	Learning Guide- 33: Report and review the application of environmental procedures.
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Monitoring and reporting effects of selected environmental controls
- Specific Site Environmental reporting procedures
- Reporting environmental risks, potential impacts and incidents
- Regular reviews of environmental procedures
- Contributions to improve environmental procedures.

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 –

- Monitor and reporting effects of selected environmental controls
- Specific Site Environmental reporting procedures
- Report environmental risks, potential impacts and incidents
- Regular reviews of environmental procedures
- Contributions to improve environmental procedures.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 4.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4” in page 30, 36, 40, 43 and 48 respectively.
4. Accomplish the “Self-check 1, Self-check 2, Self-check 3 and Self-check 4” -” in page 35, 39, 42, 47 and 51 respectively

Information sheet-1	Monitoring and reporting effects of selected environmental controls
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1.1. Monitoring and reporting effects of selected environmental controls

1.1.1. Environmental monitoring

Environmental monitoring describes the processes and activities that need to take place to characterize and monitor the quality of the environment. Environmental monitoring is used in the preparation of environmental impact assessments, as well as in many circumstances in which human activities carry a risk of harmful effects on the natural environment. All monitoring strategies and programs have reasons and justifications which are often designed to establish the current status of an environment or to establish trends in environmental parameters. In all cases, the results of monitoring will be reviewed, analyzed statistically, and published. The design of a monitoring program must therefore have regard to the final use of the data before monitoring starts.

1.1.2. Air quality monitoring

Air pollutants are atmospheric substances—both naturally occurring and anthropogenic—which may potentially have a negative impact on the environment and organism health. With the evolution of new chemicals and industrial processes has come the introduction or elevation of pollutants in the atmosphere, as well as environmental research and regulations, increasing the demand for air quality monitoring.

Air quality monitoring is challenging to enact as it requires the effective integration of multiple environmental data sources, which often originate from different environmental networks and institutions. These challenges require specialized observation equipment and tools to establish air pollutant concentrations, including sensor networks, geographic information system (GIS) models, and the Sensor Observation Service (SOS), a web service for querying real-time sensor data. Air dispersion models that combine topographic, emissions, and meteorological data to predict air pollutant concentrations are often helpful in interpreting air monitoring data. Additionally,

consideration of anemometer data in the area between sources and the monitor often provides insights on the source of the air contaminants recorded by an air pollution monitor.

Air quality monitors are operated by citizens, regulatory agencies, and researchers to investigate air quality and the effects of air pollution. Interpretation of ambient air monitoring data often involves a consideration of the spatial and temporal representativeness of the data gathered, and the health effects associated with exposure to the monitored levels. If the interpretation reveals concentrations of multiple chemical compounds, a unique "chemical fingerprint" of a particular air pollution source may emerge from analysis of the data.



Figure2: Air quality monitoring station

1.1.3. Soil monitoring

Soil monitoring involves the collection and/or analysis of soil and its associated quality, constituents, and physical status to determine or guarantee its fitness for use.

Soil faces many threats, including

- compaction
- contamination

- organic material loss
- biodiversity loss
- slope stability issues
- erosion
- salinization and
- Acidification.

Soil monitoring helps characterize these threats and other potential risks to the soil, surrounding environments, animal health, and human health.

Assessing these threats and other risks to soil can be challenging due to a variety of factors, including soil's heterogeneity and complexity, scarcity of toxicity data, lack of understanding of a contaminant's fate, and variability in levels of soil screening. This requires a risk assessment approach and analysis techniques that prioritize environmental protection, risk reduction, and, if necessary, remediation methods. Soil monitoring plays a significant role in that risk assessment, not only aiding in the identification of at-risk and affected areas but also in the establishment of base background values of soil.

Soil monitoring has historically focused on more classical conditions and contaminants, including toxic elements (e.g., mercury, lead, and arsenic) and persistent organic pollutants (POPs). Historically, testing for these and other aspects of soil, however, has had its own set of challenges, as sampling in most cases is of a destructive nature, requiring multiple samples over time. Additionally, procedural and analytical errors may be introduced due to variability among references and methods, particularly over time. However, as analytical techniques evolve and new knowledge about ecological processes and contaminant effects disseminate, the focus of monitoring will likely broaden over time and the quality of monitoring will continue to improve.



Figure3: Collecting a soil sample for pathogen testing

1.1.4. Water quality monitoring

Water quality monitoring is of little use without a clear and unambiguous definition of the reasons for the monitoring and the objectives that it will satisfy. Almost all monitoring (except perhaps remote sensing) is in some part invasive of the environment under study and extensive and poorly planned monitoring carries a risk of damage to the environment. This may be a critical consideration in wilderness areas or when monitoring very rare organisms or those that are averse to human presence. Some monitoring techniques, such as gill netting fish to estimate populations, can be very damaging, at least to the local population and can also degrade public trust in scientists carrying out the monitoring.

Almost all mainstream environmentalism monitoring projects form part of an overall monitoring strategy or research field, and these field and strategies are themselves derived from the high levels objectives or aspirations of an organization. Unless

individual monitoring projects fit into a wider strategic framework, the results are unlikely to be published and the environmental understanding produced by the monitoring will be lost.



Figure 4: Electro fishing survey methods use a mild electric shock to temporarily stun fish for capture, identification and counting. The fish are then returned to the water unharmed.

Self-Check 1	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write the definitions of environmental monitoring. (4 points)
2. What is the uses of conducting soil monitoring, air quality monitoring and water quality monitoring? (10 points)

Answer sheet

Score = _____

Rating:

1. _____

2. _____

Name: _____ Date: _____

Note: Satisfactory rating - 7 point Unsatisfactory - below 7 points
You can ask you trainer for the copy of the correct answers.

Information sheet-2	Specific Site Environmental reporting procedures
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2.1 Specific Site Environmental reporting procedures

2.1.1 Workplace environmental hazards

Workplace environmental hazards include noise pollution, air pollution, chemicals, dust, fumes and disposal hazards.

When considering what environmental hazards might exist in a workplace, think about what might happen if things go wrong. For example, storing chemicals may not be a significant environmental hazard, but a leak or spill can create a more significant hazard. Therefore, when assessing environmental hazards, you should think about all possibilities, not just what happens in daily business.

Table 2: Examples of workplace environmental hazards.

Noise pollution	Prolonged periods in a noisy environment can cause damage to hearing such as tinnitus (ringing in the ears) or permanent hearing loss. This can occur in manufacturing environments, for example. If you work in such an environment, you may be required to use protective equipment such as ear plugs or ear muffs to protect your hearing.
Air pollution	Air pollution can come from many sources, the most common being general smog levels, vehicle emissions and industrial emissions. Air pollution can cause a range of health problems including eye and throat irritations or more severe conditions such as bronchitis.
Chemicals	There are many potentially hazardous chemicals used in workplaces. These include corrosives such as sulphuric acid and caustic soda, irritants such as ammonia, and sensitising agents. Exposure can cause skin disease, poisoning or respiratory illness. These chemicals must be handled using the appropriate procedures and protective equipment.
Dust and fumes	Dust and fume hazards can be created in a variety of ways and may result in respiratory concerns. Most people are aware of the risks when handling lead or

	asbestos but some timbers, other building materials, paints and cement can also potentially affect your health and the environment. Be sure to use the appropriate protective equipment.
Disposal hazards	There are regulations for the correct disposal of many chemicals and other potentially hazardous materials. It is not appropriate to pour some chemicals down the sink or to throw some things, like batteries, into general rubbish. These materials are usually clearly marked and you should follow the instructions carefully.

2.1.2 Example: environmental hazard report procedures and report form

Environmental hazard forms will differ according to the organization and their internal structure. Here is an example of an environmental hazard form for your reference.

Table 3: Environmental hazard report form

Environmental officer to complete

Grade:

Incident no.:

Date entered:

Name:

This section is to be completed by the employee involved and handed to the manager or supervisor within 24 hours.

Employer: Sustainable Workplace, 123 Safety First Street, Metropolis

This is an: Incident Accident Near miss Minor injury

Major injury Property damage Other _____

Time of occurrence: am/pm Date of occurrence: _____

Location/address of occurrence:

Postcode:

Details _____ of _____ occurrence:

Describe what happened and include: exact location of the occurrence within the workplace (for example, desk, stairs, plant room); details of any plant and equipment involved; the process or substance involved. Attach separate sheet if insufficient space.

Name of person/s involved in the incident or injured, incapacitated:

First name: _____ Surname: _____

Position:

(if more than one person attach a separate sheet)

Risks or potential risks identified:

Witnesses:

Self-Check 2	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Prepare workplace environmental hazards and risk reporting form using above samples. (10 points)

Answer sheet

1. _____

Score = _____

Rating:

Name: _____ Date: _____

Note: Satisfactory rating –5 point Unsatisfactory - below 5 points

You can ask your trainer for the copy of the correct answers.

Information sheet-3	Reporting environmental risks, potential impacts and incidents
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3.1 Potential Environmental Impacts

3.1.1 Types of potential environmental impacts

- **Positive impacts:** Sub-projects to be implemented under the MERP are expected to generate both direct and indirect positive social and environmental impacts.
 - ✓ Direct positive social impacts will be generated by improved learning conditions in targeted receiving schools as a result the educational activities being carried out in well-equipped spaces.
 - ✓ Indirect positive impacts will relate to overall improvement of education environment, improvement in water and sanitation in schools, better ventilation and heating systems, and schools that are more accessible with people with disabilities.

Furthermore, the project would bring positive impacts in terms of energy conservation and reduction of air pollutants.

- **Negative environmental impacts:** Negative impacts mainly relate to physical and biological environmental components and are linked to water, air and soil pollution, soil erosion, loss of biodiversity and habitats, energy and water consumption, health and occupational hazards. During construction activities, which may have a relevance to MERP sub-projects, the main negative impacts would be generated during renovation works and relate to soil erosion, soil and water pollution through waste generation, air pollution, acoustic and aesthetics.

The most common potential negative impacts are summarized below:

- Dust and noise.

- Waste handling and spill response: rehabilitation and (re)construction activities will generate solid and liquid wastes including drywall, machine oil, paints, and solvents. Minor spills of fuel and other materials are likely to occur during civil works activities. Improper handling of on-site wastes and response to spills could result in adverse effects on the local environment including groundwater.
- Asbestos: In the case of inappropriate handling of asbestos this material might be a real health concern for the construction workers, and the general public in the vicinity of the rehabilitated premises in particular when it is inhaled.
- Labour and safety impacts: during civil works, in particular construction of new boilers and installation of solar panels, if workers do not obey necessary safety rules, they might be subject to various accidents')
- Health impacts associated with indoor construction activities in the case of the usage of noxious/toxic solvents and glues and of lead-based paints.
- Waste waters as the results of inadequate implementation of sanitation sub-projects.
- Pollutant air emissions from the boilers

Self-Check 3	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write the most common potential negative impacts in construction site. (5 points)
2. What is the best method to protect environmental risks, potential impacts and incidents in construction site? (5 points)

Answer sheet

1. _____
2. _____

Score = _____
Rating: _____

Name: _____ Date: _____

Note: Satisfactory rating –5 point Unsatisfactory - below 5 points
You can ask your trainer for the copy of the correct answers.

Information sheet-4	Regular reviews of environmental procedures
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4.1 Regular reviews of environmental procedures

4.1.1 Introduction

The Federal Transit Administration (FTA) Office of Environmental Programs developed standard operating procedures (SOPs) to provide additional direction and recommendations to FTA staff who are managing the environmental review process.

The environmental review process Standard Operating Procedures are supplements to existing resources, such as FTA environmental regulations and various guidance documents.

The SOPs outline FTA staff roles and responsibilities in managing the environmental review process, including development of all levels of environmental documentation.

Including:

- Categorical exclusions,
- environmental assessments,
- findings of no significant impacts,
- environmental impacts statements, and records of decision) and
- Consideration of other environmental requirements where appropriate.

4.1.2 Responsibilities

For most projects, FTA Regional staff is responsible for managing the environmental review process. While the project sponsor may perform the technical studies, conduct outreach, and prepare documentation, FTA maintains responsibility for compliance with NEPA and other relevant Federal environmental laws.

4.1.3 Standard Procedures

The following table identifies Federal Transit Administrations Environmental standard operating procedures.

Irrigation and Drainage Design and Construction Level III	Author/Copyright: Federal TVET Agency	Version -1 September 2020	Page 43 of 52
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Table 4: Federal Transit Administrations Environmental standard operating procedures.

No.	Environmental standard operating procedures	Purpose
1	Environmental Project File and Considerations for Administrative Records	Provides guidance to ensure that FTA has records of all necessary written materials, electronic or hard copy, that pertain to FTA's environmental review process for a project.
2	Project Initiation and Determining NEPA Class of Action	Provides guidance for the earliest phase of the environmental review process for FTA projects
3	Early Scoping	Provides guidance on early scoping, an optional step in the public Planning and environmental processes that precedes formal NEPA scoping.
4	Purpose and Need	Provides guidance on the purpose and need statements, which provide the rationale and justification for undertaking a major Federal action and forms the basis for the range of alternatives to be studied in the environmental document.
5	Alternatives	Provides guidance on the identification, development, and evaluation of alternatives in the environmental review process.
6	Notice of Intent	Provides guidance on the preparation of a notice of intent (NOI), which announces that FTA and other lead agencies intend to prepare an environmental impact statement.
7	Scoping	Provides guidance on scoping—an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.
8	Annotated Outline	Provides guidance on the development of annotated outlines, which can be used to create the framework for the environmental document.
9	Review and Distribution	Provides guidance for the review and processing of environmental

	of Environmental Assessments	assessments for actions in which the significance of environmental impacts is not clearly established.
10	Managing Content, Review, and Distribution of Environmental Impact Statements	Provides guidance on the drafting and processing of environmental impact statements required for any action that significantly affects the quality of the human (including natural) environment. This SOP also discusses combined final environmental impact statement/record of decision documents.
11	Receiving and Responding to Public and Agency Comments	Provides guidance on the public and agency comment process for the environmental review process.
12	Documentation of Mitigation Commitments	Provides guidance on consideration and documentation of mitigation commitments for impacts identified through the environmental review process.
13	Findings of No Significant Impact	Provides guidance on preparing a finding of no significant impact based on an environmental assessment that identifies no significant impacts.
14	Record of Decision	Provides guidance on preparing a record of decision, the decision document for an environmental impact statement.
15	Limitations on Claims	Provides guidance on FTA publication of a Limitation on Claims notice in the Federal Register announcing that FTA has taken a final agency action on a project, thereby limiting legal claims against that project.
16	Review and Management of File of Categorical Exclusions	Provides guidance on the review and application of categorical exclusions for projects.
17	Re-Evaluations and Supplemental Documents	Provides guidance on re-evaluations and supplemental documents to determine whether a completed environmental document or decision requires supplemental analysis.
18	Section 4(f) Evaluations	Provides guidance on the recommended timing of the Section 4(f) processes and to improve understanding in the transit context.

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- 19 Consideration of Contaminated Properties including Brownfields Provides guidance on assessment and acquisition considerations for property that is or may be contaminated (brownfields or suspected brownfields).
-
- 20 Agency Roles and Government-to-Government Coordination Provides guidance on agency roles and responsibilities during the environmental review process.

Self-Check 4	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. List some purposes of reviews of environmental procedures. (5 points)
2. Write environmental reviews implementation procedures. (5 points)

Answer sheet

1 _____

2 _____

Score = _____
Rating: _____

Name: _____ Date: _____

Note: Satisfactory rating –5 point Unsatisfactory - below5points
You can ask you trainer for the copy of the correct answers.

Information sheet-5	Contributions to improve environmental procedures.
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5.1 Contributions to improve environmental procedures.

5.1.1 Introduction

Improved environmental quality will reduce poverty, being the new trend in poverty alleviation. For example, dirty environment increases environmental related diseases which affect household economy, increases poverty. Environmental related diseases incapacitate man from normal daily functions, affecting household and state economy, increasing poverty. To reduce poverty, living environment of air, water and land must be clean; free of pollution and degradation.

5.1.2 Types of environmental affected issue

- Industrial and Domestic Waste Dumping:** Improper management of industrial, domestic, medical and agricultural wastes are often seen as indiscriminate waste discharge or dumping in different parts of the world. This is a major cause of environmental degradation leading to poor environmental health and diseases. It causes hazards through physical, microbiological, or chemical agents of disease. Some domestic wastes that pose environmental issue in many developing countries are human and animal feces, food and market wastes, sewage, and industrial and agricultural wastes. Improper disposal of solid wastes and the absence of engineered sanitary landfill in Nigeria could cause direct health risks to people living around the waste dumped. Human beings need to be protected as much as possible from contact with waste. Specific risks are found in handling hospitals wastes and animal wastes. The most obvious environmental damage caused by municipal solid wastes is poor aesthetic, street littering, and urban degradation causing surface to groundwater pollution. Waste burning at dump sites often result in bush burning causing pollution. Waste burning at open dumps is still practiced today in many countries; this is a major source of toxic gas emissions such as dioxins and furans, causing serious air pollution.

- **Agricultural Wastes:** Agricultural wastes resulting from fertilizer input constitute major sources of surface water pollution. Rainfall wash away the fertilizer applied to farm land rich in phosphate and nitrite thus increasing nutrient level in streams which in turn increases growth of water weed on stream water. Bush burning being part of subsistence farming contributes largely to carbon dioxide emission into the atmosphere in different parts of Nigeria and Africa. It is important to stop bush burning and regulate the use and application of fertilizer on farm land.

5.1.3 Responsibility

Each level coordinator will engage a network of key staff to support the implementation of initiatives. The coordinator for Level One will liaise with the USQ officer appointed to manage issues associated with workplace health and safety to ensure appropriate coordination between environmental protection and safety and workplace health and safety. The level coordinator, in concert with the network, will propose a set of actions and initiatives for each year.

These initiatives and actions will aim to contribute to achieving the following objectives:

- minimize or eliminate our negative environmental impacts and use of resources; work closely with our staff, unions, students, suppliers and other interested parties to continually improve our work practices and operations by setting environmental objectives and targets in accordance with best-practice standards;
- incorporate best-practice environmental management into our core business plans and management practices, including the preparation, fit out and ongoing operation of new accommodation;
- regularly monitor and report on our environmental performance;
- actively promote and encourage the adoption of ecologically sustainable work practices; and
- operations within the University and the general community;

Other workplace environmental initiatives include:

- using less paper by printing on both sides

- using less electricity by adjusting computer settings and turning machines off overnight
- using less fuel for transport by adjusting travel requirements
- introducing paper recycling schemes
- encouraging staff to use washable cups rather than disposable ones
- Donating office equipment to other organizations rather than throwing it away when it is upgraded.

Self-Check 5	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the best method to improve our environmental quality? (5 points)
2. Write at least three environmental affected waste types. (5 points)

Answer sheet

1 _____
2 _____

Name: _____ Date: _____

Score = _____
Rating: _____

Note: Satisfactory rating –5 point Unsatisfactory - below 5 points

You can ask your trainer for the copy of the correct answers.

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