



# ABU DHABI WATER AND ELECTRICITY AUTHORITY (ADWEA)

Effective Date : 18.06.2009

Volume	Chapter	Version
19	20	1

Page 1 of 22

## EXCAVATION GUIDELINES

Approved by:  
Planning & Development Director



# EXCAVATION GUIDELINES

Prepared by: \_\_\_\_\_ Date: \_\_\_\_\_  
HSE SPECIALIST

Reviewed by: \_\_\_\_\_ Date: \_\_\_\_\_  
TECHNICAL ADVISOR

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_  
PLANNING & DEVELOPMENT  
DIRECTOR



# ABU DHABI WATER AND ELECTRICITY AUTHORITY (ADWEA)

Effective Date : 18.06.2009

Volume	Chapter	Version
19	20	1

Page 2 of 22

## EXCAVATION GUIDELINES

Approved by:  
Planning & Development Director

### TABLE OF CONTENT

1. Introduction.....	4
2. Responsibilities.....	5
3. General Requirements.....	5
4. Work Permits .....	7
5. Support System Design Requirements.....	7
6. Written Excavation Plan.....	7
7. Identification of Underground Services .....	9
8. Pilot Trenching.....	10
9. Disposal of Spoil and Backfill.....	12
10. Gas Testing .....	12
11. Ventilation.....	13
12. Lighting.....	13
13. Water Removal.....	13
14. Access and Barriers .....	14
15. General Precautions.....	16
16. Failure Modes.....	16
17. Support Systems .....	17
18. Barriers.....	18
19. Means of Escape.....	18
Appendix 1 - Checklist for Excavation Plan .....	19
Appendix 2 - Checklist Prior to Start of Work .....	20
Appendix 3 - Checklist Whilst Work is in Progress .....	20





# ABU DHABI WATER AND ELECTRICITY AUTHORITY (ADWEA)

Effective Date : 18.06.2009

Volume	Chapter	Version
19	20	1

Page 4 of 22

## EXCAVATION GUIDELINES

Approved by:  
Planning & Development Director

### 1. Introduction

Excavation is the digging of holes and trenches and is carried out from time to time. It is an activity that often means hard, physical work and frequently brings men and machines together in the same work area.

There are various types of excavation, described as follows:

- An excavation is any operation that lowers or disturbs the existing ground level to a depth greater than 0.3 metres. Examples of excavation works include the digging of trenches or ditches, insertion of spikes, piling, use of crane outriggers on soft soil, and other similar activities.
- A deep excavation is any excavation that lowers the existing ground level to a depth of 1.5 metres or more.
- A shallow excavation is any excavation that lowers the existing ground level to a depth of less than 1.5 metres.
- An unsupported excavation is an excavation where the sides of the work are battered (i.e. sloped or raked) away from the bottom of the excavation to ground level, without support.
- A supported excavation is an excavation where the sides of the work are supported by timber, steel, concrete or other materials.

Hand digging means excavation using spades and other hand tools, but does not include use of spikes, pickaxes and the like, unless specifically permitted in writing. Mechanical digging means use of excavators, breakers, or any similar power assisted tools.

The total working area is the area used to get the work done, i.e. the location of the trenching, the planned area where spoil is stockpiled and the area where heavy equipment travels.

A number of inherent risks are associated with excavation and to ensure these risks are adequately controlled; various safeguards and precautions are needed. The provision of these is the purpose of this guide.

**EXCAVATION GUIDELINES**

Approved by:  
Planning & Development Director

## 2. Responsibilities

### 2.1 Excavation Supervisor

The Supervisor with responsibility for excavation works must ensure that:

- Excavation is carried out in an area only with the prior knowledge and approval of the Company representative.
- A written plan is prepared and submitted for Company approval for all excavations that exceed 1.5 meters in depth.
- All work-site supervisors are properly trained in the relevant permit to work and safety requirements for each proposed excavation.
- All possible steps have been taken to identify all underground services in the vicinity of the intended excavation and precautions taken to prevent damage to them.
- Any services not identified on the appropriate drawings that are found during the excavation are notified to the Company representative for inclusion in updates of these drawings.
- A system of review and control is established to ensure that the safety requirements of excavation activities are reviewed on a regular basis.

### 2.2 Company Representative

It is the responsibility of the Company Representative to ensure that:

- A work permit and any supporting certification have been obtained before work commences and that permit conditions are observed.
- All personnel wear the correct personal protective equipment at all times whilst undertaking the work.
- All persons are properly supervised at all times whilst the work is taking place.
- The excavation is adequately protected against possible collapse.
- The excavation is properly protected, having proper regard to location and depth.
- The safety aspects of the excavation work are properly addressed, and that any written excavation plan is properly followed.



# ABU DHABI WATER AND ELECTRICITY AUTHORITY (ADWEA)

Effective Date : 18.06.2009

Volume	Chapter	Version
19	20	1

Page 6 of 22

## EXCAVATION GUIDELINES

Approved by:  
Planning & Development Director

### 3. General Requirements

#### 3.1 Shallow Excavations

Unless unusual conditions are encountered, e.g. loose sand or the like, a shallow trench may usually be excavated without being battered or supported.

#### 3.2 Unsupported Excavations

Unsupported excavations are only allowed:

- Where the excavation depth does not exceed 1.5 metres
- Where the characteristics of the ground are known
- When the behaviour of the soil can be accurately predicted.

The maximum angle of batter permitted, in optimum conditions for any unsupported excavation, should be 45 degrees from the horizontal.

Appendix 1 gives a set of guidelines for the estimation of ground conditions and relevant slope angles.

#### 3.3 Deep Excavations

All deep excavations must either be battered, benched or shored. A written excavation plan and sketch must be prepared for all excavations greater than 1.5 metres in depth. For excavations intended to be greater than 3 metres deep, the written excavation plan must be submitted for approval to the Company Civil Engineer.

#### 3.4 Mechanical Digging

Mechanical digging is not permitted unless the area to be excavated has been checked by use of a cable location tool, and pilot trenches have been dug.

The location of any encountered services must be clearly marked with a red peg and the type of service (cable or pipe) identified. A record, usually a drawing, must be made showing the exact location of encountered services and submitted to the Company Representative. Only after he is satisfied that all necessary precautions have been taken can mechanical digging proceed.

**EXCAVATION GUIDELINES**

Approved by:  
Planning & Development Director

### 3.5 Headings and Tunnels

In addition to requiring an excavation plan, the following must be detailed for all headings and tunnelling:

- Potential hazards that may be encountered.
- Specification and quality of materials.
- Excavation techniques to be used.
- Level of workmanship required.
- Level of supervision required.

A detailed design must be included for the full length of the heading or tunnel.

A competent civil engineer must design the excavation plan for:

- Any heading or tunnel that exceeds 2 metres in height or width
- Any heading that is to be cut into rock.

### 4. Work Permits

No excavation work may be carried out without the knowledge and approval of the Company Project Manager or his authorised representative and Work Permits prepared and issued as necessary.

### 5. Support System Design Requirements

The use of supports designed and specified on site is only allowed for:

- Double sided, narrow trench support, not exceeding 6 metres in depth in non-water bearing ground.
- Shallow pits or shafts, not exceeding 6 metres in depth, in non-water bearing ground.
- Where water problems have been eliminated by other means, and the limitations above have not been exceeded.

All support requirements that do not fall within the specifications laid out above must be specially designed. This includes excavation adjacent to sectional foundations where standard excavation is not possible.

**EXCAVATION GUIDELINES**

Approved by:  
Planning & Development Director

Specialist advice should be obtained if there are any doubts as to the safety and sufficiency of any support system designed and specified on-site.

**6. Written Excavation Plan**

A written excavation plan must be prepared for all excavations intended to be greater than 1.5 metres deep. The plan must be approved by the Company Representative prior to application for any Permit to Work. For excavations intended to be greater than 3 metres in depth, the Company Representative must consult with and gain written approval for the excavation plan from the Company Project manager.

**6.1 General Considerations**

The excavation plan and attached sketches must demonstrate that consideration has been given to the following:

- Purpose and proposed depth of the excavation
- Location and nature of underground services
- Predicted nature of the ground to be excavated
- The environment in which the excavation is to be made
- Expected presence or absence of water in the ground
- Potential for water to run into the excavation from the surface
- Support system design
- Stages at which timber or sheet piling is placed in the excavation as work proceeds
- Presence of loose 'pockets' in what is otherwise firm, stable ground
- Proximity of any buildings or roads and the weight of traffic
- Whether any other important work is to be carried out adjacent to the proposed excavation
- Whether any materials are likely to be stacked nearby
- Stages of the excavation to be dug by machine or by hand tool
- Amount of room needed for raising and lowering material in the course of work
- Whether the sides of the proposed excavation can be splayed to allow more freedom and make wedging easier, the period that the excavation will be open, the maximum allowable trench length and the weather that may be expected
- Whether the timber or sheet piling can be removed safely as the back-fill proceeds

**EXCAVATION GUIDELINES**

Approved by:  
Planning & Development Director

- Access to and egress from the excavation
- Emergency evacuation of the excavation
- Requirements for a gas testing programme
- Arrangements for temporary site shelters at long-duration excavations in open areas

**6.2 Preparation**

The excavation plan will show that checks have been made to locate:

- Electric cables if a mechanical excavator is to be used.
- Gas, water and oil pipes.
- Telephone, TV and radio cables.
- Storm water, sewage and other underground transportation systems.
- The proximity of any foundations that may be affected by the excavation.

The excavation plan shall detail the relevant requirements to deal with the above obstructions in a safe manner.

**6.3 Work Planning**

The excavation plan must specify:

- Permit and excavation certificate requirements
- Detailed description of the work to be done
- Duration of the excavation work and the period for which the excavation will be opened.
- Details of mechanical excavation areas
- Types of machinery to be used
- Details of hand digging areas
- Amount of materials (timber, sheet piling etc.)
- Air and gas monitoring equipment
- Ventilation requirements and breathing equipment
- Methods of removal of water from the excavation
- Ladders
- Safety barriers, warning signs and fluorescent tape
- Fire extinguishers and first aid requirements

**EXCAVATION GUIDELINES**

Approved by:  
Planning & Development Director

- Access points, gangways and bridges
- Lighting equipment
- Pumps and compressors
- Disposal of excavated soil/waste and transportation of sand for top-up trenches, including numbers and types of vehicle required, and the route they will use to and from the excavation site.
- Emergency arrangements

The excavation plan must also show that checks have been made to ensure that the persons who will be responsible for supervising the work at site are competent to do so.

**7. Identification of Underground Services**

**7.1 Prior to Start of Work**

The presence of any underground services is to be established prior to commencement of any excavation works by taking the following steps:

- Examine plot plans of underground services.
- The total working area shall be checked on underground service plans and shall be scanned using an approved cable avoidance tool to ascertain the presence of electrical cables and underground services.
- Obtain the necessary work permits, supported by the excavation certificate.

**7.2 Cable Avoidance Tool**

Where mechanical digging is to be used, the use of a cable avoidance tool or similar, to identify possible buried services, is mandatory.

The use of mechanical diggers or graders or any other mechanical means for the removal of topsoil or grass and vegetation, prior to digging pilot trenches is strictly forbidden.

Use of the cable locator should be restricted to trained persons only.

Underground services identified are to be marked with posts specifying the types and size of services.

Scanning is not to be limited to the trench width, but include any additional areas used for drain points, battering, benching, etc.

Where the excavation is to be greater than 1 metre in width, scan at both sides of the proposed excavation and at every 5 metres across the trench.



# ABU DHABI WATER AND ELECTRICITY AUTHORITY (ADWEA)

Effective Date : 18.06.2009

Volume	Chapter	Version
19	20	1

Page 11 of 22

## EXCAVATION GUIDELINES

Approved by:  
Planning & Development Director

### 8. Pilot Trenching

Prior to mechanical digging, pilot trenches must be dug to locate any underground services. Pilot trenches must always be dug by hand in maximum depth steps of 1.5 metres, relative to the adjacent ground level.

The cable avoidance tool should be used in conjunction with pilot trenching in order to locate underground services. If any are detected, their whole length within the proposed excavation must be exposed by hand digging.

Pilot trenching is carried out using either Method A or Method B below:

#### 8.1 Pilot Trenching – Method A

Request up to date drawings of underground services in the vicinity of the proposed trench.

Use a pipe or cable location tool to scan the proposed trench.

Excavate longitudinal pilot trench by hand along both sides of the proposed trench to either the required depth plus 0.3 metres, or to a maximum depth of 1.5 metres.

Excavate transverse pilot trenches by hand every 15 metres, to the full width of the proposed excavation and to the same depth as the main pilot trench.

Repeat the scanning of the trench with the pipe or cable location tool.

Mechanical excavation of the remainder of the proposed trench area may now proceed, to a maximum depth of 1.2 metres below original ground level.

Where the proposed depth of the excavation exceeds 1.2 meters, further pilot trenching by hand in maximum steps of 1.5 meters to a maximum depth of 3.0 meters is repeated, following the general methods above, prior to further mechanical excavation.

#### 8.2 Pilot Trenching – Method B

Request up to date drawings of underground services in the vicinity of the proposed trench.

Use a pipe or cable location tool to scan the proposed trench.

Excavate longitudinal pilot trench by hand along the middle of the proposed trench to either the required depth plus 0.3 metres, or to a maximum depth of 1.5 metres.



## ABU DHABI WATER AND ELECTRICITY AUTHORITY (ADWEA)

Effective Date : 18.06.2009

Volume	Chapter	Version
19	20	1

Page 12 of 22

### EXCAVATION GUIDELINES

Approved by:  
Planning & Development Director

Excavate transverse pilot trenches by hand every 5 metres, to the full width of the proposed excavation and to the same depth as the main pilot trench.

Repeat the scanning of the trench with the pipe or cable location tool.

Mechanical excavation of the remainder of the proposed trench area may now proceed, to a maximum depth of 1.2 metres below original ground level.

Where the proposed depth of the excavation exceeds 1.2 metres, further pilot trenching by hand in maximum steps of 1.5 metres to a maximum depth of 3.0 metres is repeated, following the general methods above, prior to further mechanical excavation.

**Note:** Method B tends to become uneconomic where the transverse pilot trench width exceeds 7 metres.

#### 9. Disposal of Spoil and Backfill

##### 9.1 Disposal of Spoil

Non-shored excavations:

Spoil may be disposed of along the sides of the excavation, provided that the distance to the edge of the nearest portion of the spoil heap is not less than the final excavation depth.

Shored excavations:

Spoil may be disposed of along the sides of the excavation, provided that the distance to the edge of the nearest portion of the spoil heap is greater than 1 metre.

##### 9.2 Backfill

Where backfill using wheeled or tracked vehicles is to take place, or the excavation is in an area where it is foreseeable that vehicles may attempt to approach close to the excavation, stop boards should be fitted at a distance of 1.2 metres from the excavation.

#### 10. Gas Testing

A gas testing programme must be used where:

- There is a potential for oxygen deficient atmospheres to occur. Work must be suspended in atmospheres where the oxygen content is 20% or less.

*This document is the property of ADWEA, and can not be used nor given to outside party without prior authorisation*

**EXCAVATION GUIDELINES**

Approved by:  
Planning & Development Director

- The excavation takes place in ground known or suspected to be contaminated with oil or other potentially flammable materials to such a degree that a flammable atmosphere may occur. Work must be suspended if a Lower Flammable Limit (LFL) of 1% is exceeded.
- Depending on the nature of the excavation and the location of supporting equipment, there is a potential for a build up of toxic gases such as carbon monoxide (emitted from internal combustion engines) or hydrogen sulphide (produced as a by-product of bacterial decay). Work must be suspended if half of the Occupational Exposure Standard (OES) or the Short Term Exposure Limit (STEL) for the toxic gas is reached (as specified in current edition of U.K. HSE "Guidance Note EH40").

The gas testing programme will form part of the excavation plan.

Where a hazardous atmosphere is found, the work must be suspended and the excavation treated as a confined space.

**11. Ventilation**

In conjunction with the gas testing programme, excavations with a potential for oxygen deficient atmospheres, build up of flammable gas mixtures or toxic gases must be artificially ventilated by means of air scoops or electric blowers.

In general, internal combustion engines should not be used inside excavations, except on a short term basis such as compaction machines for backfill. Where internal combustion engines are used near the edge of an excavation, care must be taken to ensure that exhaust fumes are directed away from the excavation.

**12. Lighting**

Consideration must be given to illuminating excavations during darkness.

When work is in progress during the hours of darkness or in deep excavations, shafts and tunnels, sufficient lighting must be provided to allow safe working.

**13. Water Removal**

**13.1 Rain and Surface Water**

Wherever surface ditches, streams, etc. are incapable of draining off excess water, trenches must be constructed to carry the water away from the excavation.

Trenches must be designed to cope with the maximum rainfall expected whilst the excavation is in progress. If unexpectedly high rainfall occurs during excavation, water removal by manual or mechanical means must be carried out.



# ABU DHABI WATER AND ELECTRICITY AUTHORITY (ADWEA)

Effective Date : 18.06.2009

Volume	Chapter	Version
19	20	1

Page 14 of 22

## EXCAVATION GUIDELINES

Approved by:  
Planning & Development Director

### 13.2 Ground Water

Where the presence of ground water may create difficult working conditions or endanger the stability of the sides and/or floor of the excavation, the excavation should be surrounded by interlocking steel sheeting, an in-situ concrete diaphragm or a grout curtain to prevent the water from entering the excavation. As an alternative, a ground de-watering programme may be used to keep excavations clear of water whilst work proceeds or to reduce the loads which bear on the earthworks support materials.

The ground de-watering programme must be either by drainage, or by installing well-points around the site and pumping out the water to lower the ground water table to below that of the excavation. Before a ground de-watering programme is instigated, expert advice may need to be taken to establish:

- The feasibility of such a programme in the ground conditions pertaining to the excavation
- That, as a result of de-watering, no fine materials will be drawn from under adjacent structures with consequent risk of settlement.

### 14. Access and Barriers

#### 14.1 Access

Access to all excavations must be controlled and restricted to the minimum number of personnel required for the performance of the work.

A safe means of access to and from the excavation must be provided for personnel and machinery.

Reflective or illuminated barriers should be considered where the ambient lighting is inadequate.

#### 14.2 Gangways and Bridges

Safe means of access must be provided where personnel are required to cross excavations. Any gangway provided must be suitable for the intended task, and where the span or materials used are adequate, it must be approved by competent engineers.

Where personnel may fall 2 metres or more, gangways must be:

- Fitted with guard-rails and toe-boards

**EXCAVATION GUIDELINES**

Approved by:  
Planning & Development Director

- At least 0.46m wide for personnel access and 0.6m wide for personnel and materials access.

**14.3 Material and Vehicular Access**

Bridges must be installed where plant and vehicles are required to cross excavations. All bridges are to be specifically designed and constructed by competent engineers to ensure:

- The safety of drivers, vehicles and loads
- That the edges of the excavation are not damaged or excessively loaded.

All bridges must be clearly sign-posted to indicate maximum permissible loads and flashing amber lights installed on bridges that are to remain open at night.

The construction of temporary bridges across excavations by the use of simple steel plates, scaffold boards, etc. is prohibited.

**14.4 Barriers**

All excavations, irrespective of the depth, must be suitably barriered to restrict access by personnel not associated with the excavation activities.

Barriers and stop blocks are to be erected at a suitable distance from the excavation to prevent:

- Personnel or vehicular traffic from damaging the excavation
- Accidental access to the excavation of personnel and equipment.

In addition, the edges of all excavations where personnel may fall more than 2 meters must be protected by rigid barriers or excavations securely covered.

Non-rigid barriers may be used in areas where access for persons and transport is not required. The materials used should give an obvious warning by being immediately apparent and brightly coloured.

Wherever barriers are set back from the edge of the excavation, all access to the excavation must be confined to proper paths and roads with no materials stacked in the space between the barriers and the edge of the excavation.

**EXCAVATION GUIDELINES**

Approved by:  
Planning & Development Director

**15. General Precautions**

Ensure that:

- The written excavation plan is followed at all times.
- The correct personal protective equipment is being worn.
- Barriers are in place and are of an adequate construction.
- Stops for lorries and dump trucks are in place to prevent them falling into the trench.
- Signs and warning lights are adequate for the purpose.
- Tipping areas are clear.
- Foot vehicle bridges are in a safe condition, supported and with rails in place.
- Debris boards are in place.
- Safe access and egress is maintained.
- The ground and water table is as assumed for the excavation plan.
- Pumping operations do not remove fine particles from the soil and weaken the structure.
- Wedges are secure on timbering and sheet piling and supports are safe during any compaction operations.
- Exhausts are positioned clear of the trench or excavation.
- Trench sides are clear of hazards.
- The ground is not deteriorating during the work.
- Proper slinging arrangements have been made for the removal of debris.
- Visibility and lighting is adequate.
- The edges of the excavation are clear of soil and debris for a distance equivalent to the excavation depth, or 1.0 metres in the case of shored excavations.
- Work is suspended if an underground service is damaged. Broken cables and burst pipes must be reported to the Area Authority as soon as possible to obtain isolations and repairs. All incidents must be reported.

**16. Failure Modes**

In shallow and unsupported excavations ensure that the type of ground being excavated is not liable to the failures which may occur in relatively shallow excavations.



## ABU DHABI WATER AND ELECTRICITY AUTHORITY (ADWEA)

Effective Date : 18.06.2009

Volume	Chapter	Version
19	20	1

Page 17 of 22

### EXCAVATION GUIDELINES

Approved by:  
Planning & Development Director

#### 16.1 Soft Clay

Ensure that unsupported or battered excavations in soft clays do not fail due to “rotation”.

#### 16.2 Stiff Clay

Ensure that unsupported or battered excavations in stiff clays do not fail due to:

- The relief of lateral restraint which allows the top of the excavation to swell inwards
- Rain or other surface water penetrating fissures at the surface and softening the clay (earth falls are more frequent in wet weather).

#### 16.3 Rock

Ensure that the rock being excavated in unsupported or battered rock excavations is not separated into bedding planes, cleavage planes or fissures which form planes of weakness along which the rock may slide.

Ensure that all loose rocks hanging to the excavation face are removed as the digging proceeds.

Large volumes of heavy rock can move short distances very rapidly. Ensure that rock excavations are supported, even for shallow excavations, if there is any doubt over the integrity of the rock face.

### 17. Support Systems

#### 17.1 Supports Designed and Specified On-site

Where excavation supports are designed and specified on-site, ensure that:

- Proper account has been taken of the ground conditions when deciding the method of support
- The method of support complies with recognised good practice in all details.

Where proprietary systems are used, ensure that the installation is strictly in accordance with the manufacturer’s instructions.

Ensure that the system of work to be adopted is explained in detail to all of the persons engaged in placing or removing supports, and others who will be working in the excavation.

**EXCAVATION GUIDELINES**

Approved by:  
Planning & Development Director

If practicable, the system of work should be illustrated with drawings or sketches, or with suitable proprietary literature, together with checklists. Ensure that the method of work and instructions and sketches provided are strictly adhered to.

**17.2 Supports Designed by Specialist Designers**

The instructions laid down by the specialist designers must be followed at all times whilst the excavation is in progress.

**18. Barriers**

Ensure that barriers are erected as soon as practicable after excavation commences. (Barriers may be omitted, or moveable barriers may be placed, at specific points to allow access of personnel or the movement of plant, equipment and materials.)

Ensure that:

- Barriers or stop-blocks are fitted at all locations where cranes, dump trucks, lorries, tippers, etc. manoeuvre close to the edge of the excavation.
- The edges of the excavation are protected from damage during vehicle manoeuvres.

**19. Means of Escape**

Ensure that means of escape and rescue are provided and maintained throughout the duration of the excavation activities.

Ensure that all personnel are instructed in the escape and rescue procedures which should be followed in the event of an emergency.



## ABU DHABI WATER AND ELECTRICITY AUTHORITY (ADWEA)

Effective Date : 18.06.2009

Volume	Chapter	Version
19	20	1

Page 19 of 22

### EXCAVATION GUIDELINES

Approved by:  
Planning & Development Director

#### Appendix 1 - Checklist for Excavation Plan

The following information will be required in order to determine the method of excavation and the need for support. In addition, in the case of trench work in particular, what has to go into the trench or excavation will be important. The handling of such items may well affect the form of support that can be used. The answers to the following questions need to be considered before any decisions can be taken.

1. What are the soil types and groundwater conditions?
2. Is there any knowledge of previous work carried out in the area?
3. Is the excavation adjacent to existing structures or roads?
4. Are there any obstructions to the line of the excavation e.g. cables, sewers, industrial mains, overhead cables, or limited clearance on the line of the excavation which may restrict choice of excavating equipment?
5. Has the condition of adjacent buildings been recorded, e.g. cracks, etc?
6. Is there any risk of surface flooding whilst the work is being carried out? Is flooding from services possible?
7. Is the excavation within the Company operating area?
8. If the excavation is a pipe trench, what are the maximum depths to be supported? What size and length of pipe have to be handled? Can pipes be tested in short lengths or does the specification require testing of greater lengths?
9. In the case of wide excavations, what will be the implications of the support system to the permanent work – and vice-versa?
10. What surcharge loads are likely to arise?
11. Will the support method involve vibration? Will it affect the stability of the excavation and/or adjacent buildings?
12. Is it possible to formulate a safe excavation plan with the information available, or will other information be required?

**EXCAVATION GUIDELINES**

Approved by:  
Planning & Development Director

**Appendix 2 - Checklist Prior to Start of Work**

1. Is the person directly supervising the work, fully experienced and competent in the support of excavations?
2. Have all services been located and proved as to position?
3. Are the necessary drawings or sketches (where on-site developed support designs are to be used) available? Have the operatives been properly briefed and instructed as to what is required of them?
4. Are all materials necessary available on site and in accordance with the drawings/sketches?
5. Has all machinery to be used in the excavation been certified as fit for use and is it suitable for the work it will be undertaking?
6. What arrangements are required with regard to site security (especially for those sites where members of the public may enter the area)?
7. Is there adequate working space for the proposed plant and equipment to be used?
8. Is there adequate room for spoil heaps and are they positioned more than 1.5 metres from the edge of the excavation?
9. Will bridges or gangways be needed? If so, are the materials and equipment ready?
10. Are there sufficient ladders available for access to and from the excavation?
11. Will lighting be required?
12. Is all the appropriate personal protective equipment available for personnel?
13. Are all personnel competent to carry out this type of excavation without additional training and/or supervision?

**EXCAVATION GUIDELINES**

Approved by:  
Planning & Development Director

**Appendix 3 - Checklist Whilst Work is in Progress**

The following list covers only the main points which need to be checked when inspections and examinations are being carried out whilst work is in progress.

1. Is access to and from the work face sufficient and secure from danger?
2. Are all working faces secure, wedges tight and support material free from damage?
3. Is there any sign of movement or deflection in the support system?
4. Is the soil condition as predicted? If not, what action should be taken?
5. Are the spoil heaps being properly maintained and positioned more than 1.5 metres from the edge of the excavation?
6. Are pipes, bricks and other materials kept well clear from the edge of the excavation so that there is no risk of them falling into the excavation due to accidental dislodgement?
7. Is all plant and machinery kept well clear from the edge of the excavation so that there is no risk of vibration damaging the support?
8. Are the drawings/sketches being properly followed in installing the support? (Particularly the spacing of walling and struts.)
9. Are the walling and struts, or proprietary equipment, supported against falling downward – by hangers, puncheons, lip blocks etc.?
10. Is there any risk of flammable or toxic gases entering the excavation?
11. Is there any risk of an oxygen deficient atmosphere occurring inside the excavation?
12. Has the risk of flooding been properly assessed?
13. Are resuscitation equipment and a person trained in its use, available?
14. Have all personnel been instructed in the evacuation procedure for the excavation, and the correct rescue procedure to follow, if someone is overcome by toxic or asphyxiating gases.
15. Have all support materials been checked before installation in the excavation? In particular are the correct pins provided in the trench struts?



## ABU DHABI WATER AND ELECTRICITY AUTHORITY (ADWEA)

Effective Date : 18.06.2009

Volume	Chapter	Version
19	20	1

Page 22 of 22

### EXCAVATION GUIDELINES

Approved by:  
Planning & Development Director

16. Is the work adequately barriered off? Have all the relevant safety signs been posted at entry/exit points? Is the work adequately barriered or covered and lit at night? Are watchmen needed?
17. Are personnel wearing the proper personal protective equipment? Are any other items of PPE required?
18. In pits, shafts and tunnels, in particular, is adequate lighting provided? Is the temporary lighting system safe and free from damage?
19. Are gangways and bridges properly designed and constructed and in a good state of repair? Are they the correct width? Do they have the correct guard-rails and toe-boards?
20. Where backfill is required are stop blocks fitted?
21. Is the support withdrawal part of the excavation plan still feasible? Are the persons carrying out the support withdrawal competent to carry out the work and have they been properly instructed?
22. Where pumping is taking place, is a proper check being kept to ensure that fine material is not being withdrawn from behind the support system?
23. Are the operatives all working in a safe and competent manner?
24. Is the excavation plan being followed? Is it working or does it require some amendment so that the task can be performed more safely? Do you require expert assistance in any of the tasks which are being performed?
25. **DOES THE SITE HAVE THE PROPER ONGOING SUPERVISION WHICH IS ESSENTIAL TO MAINTAIN A SAFE PLACE OF WORK?**