

# CARRY OUT ROAD CONSTRUCTION WORKS

**UNIT CODE:** CON/OS/CET/CR/04/6/A

## UNIT DESCRIPTION

This unit specifies the competencies required to perform road construction works. It involves carrying out earthwork activities, constructing road/pavement structure layers and constructing parking, walkways and cyclist lanes, footbridges and bus bays. It also includes installing road furniture, construction of erosion prevention structures, constructing highway drainage and hydraulic structures and undertaking highway maintenance.

## ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
<p>These describe the <b>key outcomes</b> which make up workplace function (to be stated in active)</p>	<p>These are <b>assessable statements</b> which specify the required level of performance for each of the elements (to be stated in passive voice)</p> <p><b><i>Bold and italicized terms are elaborated in the Range</i></b></p>
<p>1 Carry out earthwork activities</p>	<p>1.1 Relevant legal documents are obtained as per the contract requirements</p> <p>1.2 <b><i>Earthwork resources</i></b> are identified and mobilized as per the contract document</p> <p>1.3 <b><i>Site clearance and demolition activities</i></b> is carried out based on contract document and construction procedures</p> <p>1.4 Drawings are interpreted as per construction procedures</p> <p>1.5 Setting out for earthworks is conducted based on design output</p> <p>1.6 <b><i>Statutory requirements</i></b> are obtained based on contract document and standard construction procedures</p> <p>1.7 Road formation is established based on standard construction procedures</p> <p>1.8 Ground levels are taken and documented according to SOPs</p> <p>1.9 Volumes of <b><i>cut and fill materials</i></b> is determined in accordance with contract document</p> <p>1.10 Haulage and disposal of waste material is carried out as per the standard construction procedures</p> <p>1.11 Construction tools and equipment are operated and maintained as per the SOPs</p>

<p>2 Construct road/pavement structure layers</p>	<p>2.1 Required <b>road construction resources</b> are acquired and mobilized as per contract document</p> <p>2.2 Drawings are interpreted as per construction procedures</p> <p>2.3 <b>Levelling activities</b> are carried out as per standard construction procedures</p> <p>2.4 Sub-grade pavement layer is constructed according to contract document and standard road requirements</p> <p>2.5 Sub-base pavement layer is constructed as per contract document and standard road requirements</p> <p>2.6 Base layer is constructed according standard road construction procedures and contract document</p> <p>2.7 Ground levels are documented as per standard procedures</p> <p>2.8 Road surfacing is constructed as per the contract document and standard construction procedures</p> <p>2.9 <b>Quality control operations</b> are carried out according standard construction procedures</p> <p>2.10 Maintenance of road/pavement structures is undertaken as per maintenance procedures</p> <p>2.11 Construction tools and equipment are operated and maintained as per the SOPs</p>
<p>3 Construct parking walk ways and cyclist lanes, foot bridges, bus bays</p>	<p>3.1 Required resources are acquired and mobilized as per contract document</p> <p>3.2 Drawings are interpreted as per standard construction procedures</p> <p>3.3 Parking are constructed according to contract document, design manuals and standard construction procedures</p> <p>3.4 Walk ways, cyclist lanes and bus bays are constructed according to contract document, design manuals and standard construction procedures</p> <p>3.5 Foot bridges are constructed according to contract document, design manuals and standard construction procedures</p> <p>3.6 Levelling activities are carried out as per standard construction procedures</p> <p>3.7 Ground levels are documented as per standard procedures</p> <p>3.8 Quality control operations are carried out according standard construction procedures</p>

	<p>3.9 Maintenance of parking, walk ways and cyclist lanes, foot bridges, bus bays is undertaken as per maintenance procedures</p> <p>3.10 Construction tools and equipment are operated and maintained as per the SOPs</p>
4 Install road furniture	<p>4.1 <b>Road furniture</b> are mobilized according to contract document and designs</p> <p>4.2 Interpretation of drawings is carried out according to the contract document and relevant manuals</p> <p>4.3 Location of road furniture on the road is determined according to standard road procedures and legal requirements</p> <p>4.4 Road furniture for installation are identified and acquired as per contract document</p> <p>4.5 Road furniture are installed on the road based on standard construction procedures</p> <p>4.6 Quality control procedures on road furniture installation are undertaken as per relevant manuals</p> <p>4.7 Maintenance activities on road furniture are carried out based on standard maintenance procedures</p> <p>4.8 Traffic signs are reviewed according to standard requirements</p> <p>4.9 Maintenance of road furniture is undertaken as per maintenance procedures</p> <p>4.10 Construction tools and equipment are operated and maintained as per the SOPs</p>
5 Construct erosion prevention structures	<p>5.1 Construction resources are mobilized as per contract document</p> <p>5.2 <b>Erosion control structures</b> for construction are determined based on prevailing site conditions</p> <p>5.3 Location of erosion prevention structures is established according to contract document</p> <p>5.4 Interpretation of drawings is carried out as per standard construction procedures</p> <p>5.5 Construction of erosion prevention structures is carried out in accordance with standard construction methods</p> <p>5.6 Quality control procedures are undertaken according standard procedures</p> <p>5.7 Maintenance of erosion prevention structures is undertaken as per maintenance procedures</p> <p>5.8 Construction tools and equipment are operated and maintained as per the SOPs</p>

<p>6 Construct highway drainage and hydraulic structures</p>	<p>6.1 Highway drainage and hydraulic structures construction is planned for</p> <p>6.2 Culverts are constructed</p> <p>6.3 Side drains, mitre drains and cut-off drains are constructed</p> <p>6.4 Sub-surface drains and gullies are constructed</p> <p>6.5 Bridges are constructed</p> <p>6.6 Drifts and causeways are constructed</p> <p>6.7 Retaining walls are constructed</p> <p>6.8 Maintenance of highway drainage and hydraulic structures is undertaken as per maintenance procedures</p> <p>6.9 Construction tools and equipment are operated and maintained as per the SOPs</p>
<p>7 Undertake highway maintenance</p>	<p>7.1 Pavement conditions are assessed</p> <p>7.2 Maintenance activities are prepared for</p> <p>7.3 Emergency maintenance works are carried out</p> <p>7.4 Routine maintenance activities are performed</p> <p>7.5 Periodic maintenance works are carried out</p> <p>7.6 Construction tools and equipment are operated and maintained as per the SOPs</p>

## RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

VARIABLE	RANGE
<p>1 Earthwork resources may include but not limited to:</p>	<ul style="list-style-type: none"> <li>• Bull dozers</li> <li>• Graders</li> <li>• Back hoes</li> <li>• Tippers</li> <li>• Shovels</li> <li>• Excavators</li> <li>• Grabbers</li> <li>• Rollers</li> <li>• Compactors</li> <li>• Cranes</li> <li>• Dump trucks</li> <li>• Off-highway dumpers</li> </ul>

<p>2 Site clearance and demolition activities may include but not limited to:</p>	<ul style="list-style-type: none"> <li>• Tree felling and stump removal</li> <li>• Boulders removal</li> <li>• Bush clearing</li> <li>• Grass cutting</li> <li>• Stripping</li> <li>• Removal cotton soil</li> <li>• Isolation and diversion of live services</li> <li>• Demolition of buildings, walls and bridges</li> <li>• Removal of existing pipelines, public and privately-owned services or supplies</li> <li>• Removal of fencing and hedges</li> </ul>
<p>3 Statutory requirements may include but not limited to:</p>	<ul style="list-style-type: none"> <li>• Approved site working drawings</li> <li>• Licenses</li> <li>• Permits</li> <li>• Agreement</li> <li>• Bill of Quantities</li> </ul>
<p>4 Road construction resources may include but not limited to:</p>	<ul style="list-style-type: none"> <li>• Machinery</li> <li>• Materials</li> <li>• Human resources</li> <li>• Plant</li> </ul>
<p>5 Levelling activities may include but not limited to:</p>	<ul style="list-style-type: none"> <li>• Setting out</li> <li>• Excavation</li> <li>• Cutting and filling</li> <li>• Reading and booking levels</li> <li>• Computing levels</li> </ul>
<p>6 Quality control operations may include but not limited to:</p>	<p>Include but not limited to:</p> <ul style="list-style-type: none"> <li>• Tests <ul style="list-style-type: none"> <li>○ Maximum dry density</li> <li>○ Cone penetration</li> <li>○ Plasticity index</li> <li>○ California Bearing Ratio (CBR)</li> <li>○ Shear tests</li> <li>○ Marshall test</li> </ul> </li> <li>• Monitoring and evaluation</li> </ul>
<p>7 Cut and fill materials may include but not limited to:</p>	<ul style="list-style-type: none"> <li>• Rocks</li> <li>• Soils <ul style="list-style-type: none"> <li>7..1 Gravel</li> <li>7..2 Volcanic</li> </ul> </li> </ul>

<p>8 Road furniture may include but not limited to:</p>	<ul style="list-style-type: none"> <li>• Traffic signals</li> <li>• Traffic warning signs</li> <li>• Information signs</li> <li>• Street lightings</li> <li>• Road markings</li> <li>• Pedestrian crossing</li> <li>• Guard rails</li> <li>• Road barriers</li> <li>• Road islands</li> <li>• Road kerbs</li> <li>• Bollards</li> </ul>
<p>9 Types of erosion control structures may include but not limited to:</p>	<ul style="list-style-type: none"> <li>• Gabions</li> <li>• Retaining walls</li> <li>• Vegetation</li> <li>• Scour check</li> <li>• Dykes</li> <li>• Benches</li> <li>• Catch basins</li> </ul>

## REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

### Required Skills

The individual needs to demonstrate the following skills:

- Technical
- Interpretation
- Numerical
- Basic management
- Leadership
- Analytical
- Problem solving
- Communication
- Creativity
- Innovation
- Interpersonal

### Required Knowledge

The individual needs to demonstrate knowledge of:

- Construction plant and equipment
  - Types
  - Uses

- Housekeeping
- Setting out
  - Horizontal alignment
  - Vertical alignment
- Site clearance activities
  - Tree and stump removal
  - Boulders removal
  - Bush clearing
  - Grass cutting
  - Vegetable soil removal
- Cut and fills
- Standard road construction procedures e.g. excavation, cut material disposal, compaction
- Types of pavement
  - Rigid
  - Flexible
- Road layers' construction procedures
- Contract document
- Interpret drawings
- Quality control procedures
- Levelling activities
- Types of road construction materials
- Alternative construction methods
- Statutory requirements e.g. NCA, NEMA
- Construction procedures
- Types of walk ways and cyclist lanes, parking and bus bays
- Types of foot bridges and their design
- Road furniture types
- Interpret drawings
- Maintenance procedures
- Relevant manuals
- Statutory requirements
- Types of erosion prevention structures
  - Gabions
  - Catch basins
  - Scour checks
- Quality control procedures
- Use of Personal Protective Equipment

## **EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

<p>1 Critical Aspects of Competency</p>	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> <li>1.1 Interpreted drawings and designs</li> <li>1.2 Demonstrated the ability to mobilize machines and construction resources</li> <li>1.3 Obtained and observed statutory requirements</li> <li>1.4 Performed site clearances and demolition activities</li> <li>1.5 Carried levelling activities</li> <li>1.6 Constructed road/pavement structures</li> <li>1.7 Carried out quality control operations accordingly</li> <li>1.8 Constructed Parking, walk ways and cyclist lanes, foot bridges, bus bays</li> <li>1.9 Installed road furniture</li> <li>1.10 Constructed erosion prevention structures as required</li> <li>1.11 Constructed highway drainage and hydraulic structures</li> <li>1.12 Carried out highway maintenance</li> </ul>
<p>2 Resource Implications</p>	<p>The following resources should be provided:</p> <ul style="list-style-type: none"> <li>2.1 New road under construction</li> <li>2.2 Road under maintenance</li> <li>2.3 Workstation</li> <li>2.4 Road construction resources</li> <li>2.5 Stationery</li> <li>2.6 Standard manuals</li> <li>2.7 Contract documents</li> <li>2.8 Human resource</li> <li>2.9 Schedule of works</li> </ul>
<p>3 Methods of Assessment</p>	<p>Competency in this unit may be assessed through:</p> <ul style="list-style-type: none"> <li>3.1 Observation</li> <li>3.2 Oral</li> <li>3.3 Written</li> <li>3.4 Third party Report</li> <li>3.5 Case study</li> <li>3.6 Portfolio</li> </ul>
<p>4 Context of Assessment</p>	<p>Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment or during industrial attachment.</p>
<p>5 Guidance information for assessment</p>	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>