



Implement a paving project

AHCLSC306

By the end of this topic, you should be able to:

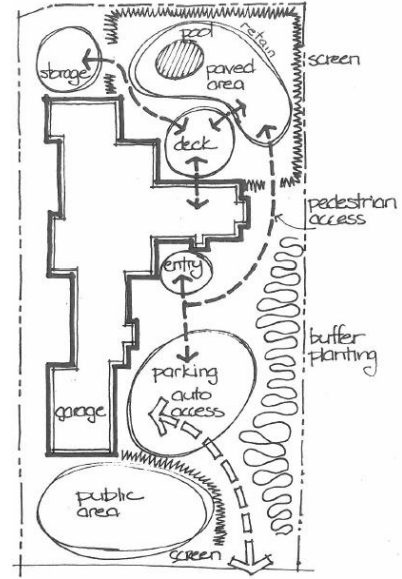
- Prepare for paving project
- Set out and prepare the site
- Implement paving project
- Check quality of work and clean-up site

You will be directed to complete a number of activities during this presentation.
Compile your responses into one submission and email your work to training@cstc.org.au
with the subject 'AHCLSC306 Activities'

Preparing for paving project

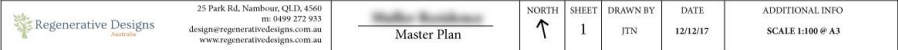
- To prepare for paving projects, you should interpret plans and specifications
 - Landscape concept plans
 - These are a visual record of ideas
 - Usually rough freehand drawings

Activity 1: Identify/list the scope of the work to be carried out from the concept plan shown to the right



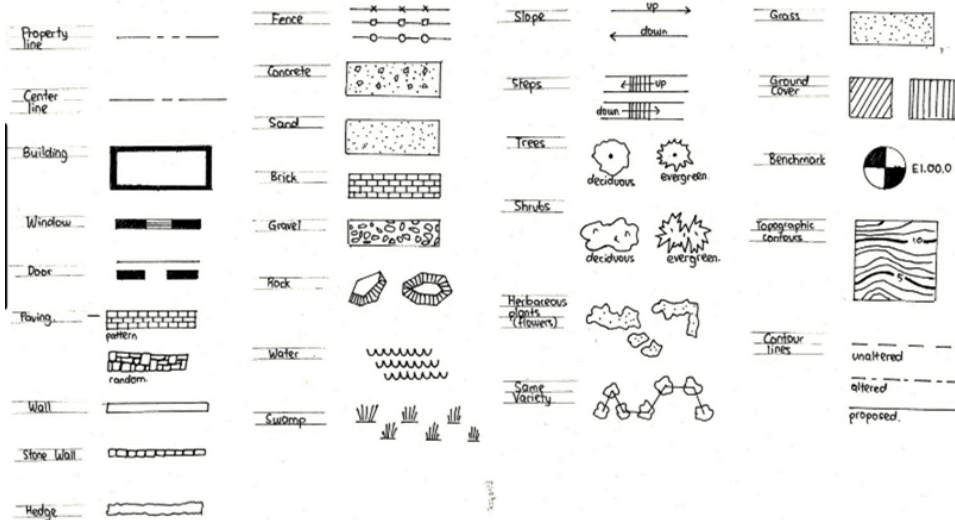
Preparing for paving project

- Activity 2:
Identify/list the detail
on the landscape
plan shown



Preparing for paving project

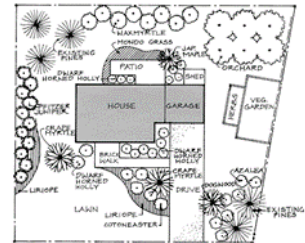
- To prepare for paving projects, you should interpret construction details



Activity 3: Using the graphics shown, create a simple plan that details a paved path through a garden with grass, trees, shrubs, rocks and steps

Preparing for paving project

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- To prepare for paving work, you should familiarise yourself with the task requirements
 - Refer to plans and specifications for
 - Location of services
 - Drainage and irrigation requirements
 - Measurements and pattern of paving
 - Required materials, tools and equipment
 - Compaction requirements
 - Apply calculations
 - Area (m^2): $L \times W$
 - Volume (m^3): $L \times W \times D$

- To prepare for paving work, you should familiarise yourself with workplace information
 - Safety documentation:
 - Job Safety Analysis (JSA) for an analysis of potential hazards completing the task on site
 - Safe Work Method Statement (SWMS): Outlines how activities are to be carried out safely
 - Safety Data Sheet (SDS): Explains how to safely handle, use and dispose of hazardous materials
 - Site safety plans: Explains emergency procedures
 - Environmental plans to determine appropriate practices (e.g. clean up, noise control)

Preparing for paving project

- To prepare for paving work, you should familiarise yourself with the work area
 - Identify any WHS hazards and assess risks (e.g. unauthorised persons in work area, underground services)
 - Consider the environmental impacts of the proposed works (e.g. water run-off)
- Report hazards to your supervisor within a timely fashion – especially emergency situations

Workplace risk assessment

- Risk is measured in terms of the seriousness of the possible **consequences** of the hazard and the **likelihood** that those consequences will occur, as in the matrix shown below:

Likelihood

- 1: Very Likely
- 2: Likely
- 3: Possible
- 4: Unlikely
- 5: Very Unlikely

Consequences

- A: Death or Permanent Disability
- B: Serious Injury
- C: Lost Time Injury
- D: Casualty Treatment
- E: First Aid

Matrix	A	B	C	D	E
1	E	E	H	H	M
2	E	H	H	M	M
3	H	H	M	M	L
4	H	M	M	L	L
5	M	M	L	L	L

Preparing for paving project

- To prepare for paving work, you should organise required PPE, machinery, tools and equipment
 - **PPE may include:** Gloves, face mask, goggles, long pants, sleeved clothing, wide brimmed hat, work boots
 - **Machinery may include:** Plate compactor, vibratory roller, brick saw
 - **Safety equipment may include:**
 - Bunting and barricades to reduce risks to personnel on site (e.g. marking exclusion zones)
 - Signage to convey safety messages – placed visibly in the relevant work area, at eye height
 - **Tools and equipment may include:** Brooms, rakes, shovels, wheelbarrows, water hoses, concreting tools/equipment, hammer, bolsters, rubber mallet, angle grinder, formwork, stringline, line level, spirit level, tape measure, square, builder's pencils, screed, screed rails



Ensure they are appropriately selected, prepared and used for the task, following manufacturer recommendations

Preparing for paving project

- The materials to be used for paving work will differ depending on the work to be completed.
- However, some common materials include:
 - Sub base (e.g. roadbase, decomposed granite)
 - Bedding materials (e.g. river sand, crusher dust)
 - Bricks and pavers (e.g. clay, concrete, stone)
 - Slate (random and regular)
 - Stone segments
 - Waterproofing materials

Activity 4: Research the advantages and disadvantages of concrete, clay and stone pavers

It is your responsibility to liaise with suppliers to organise materials delivery to the site, according to workplace priorities

Preparing for paving project

- Paving material varies in size, colour, design, structure, texture and price, so it is important to choose the right paver for the job
 - Decide on the colour, as colour is powerful in creating mood and feelings
 - Complementarity or contrast
 - Multi-coloured or monotone

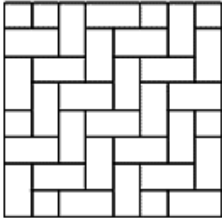
Activity 5: Obtain photographs of common landscaping materials and finished landscapes (both soft and hard).

Explain the differences between your emotions/feelings when you see each photograph in black and white and in colour.

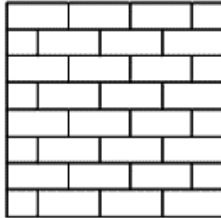
Preparing for paving project

- As well as choosing colours, it is important to choose a suitable pattern for the project

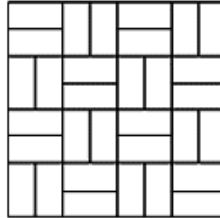
Herringbone



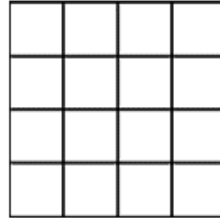
Stretcher Bond



Basketweave



Stackbond



Colour and pattern influence each other

Activity 6: Research and identify eight (8) different paving patterns, including the common usage, advantages and disadvantages for each pattern



Set out and prepare the site

- Follow the steps outlined below when laying pavers:
 - Undertake calculations
 - Area to be paved
 - Materials required (e.g. volume)
 - Area formulae for common shapes

Rectangle/ Square	Triangle	Circle
Length x Width Example: An area 10m long and 5m wide $= 10 \times 5$ $= 50\text{m}^2$ (square metres) NB: Do not confuse 50 square metres with 50 metres squared (which is 50m x 50m)	Length x Width $\div 2$ Example: A triangle with a base of 20m and a height of 5m $= 20 \times 5 \div 2$ $= 50\text{m}^2$ (square metres)	π $\times$ r^2 Where $\pi = 3.14$ and r = radius (half the total distance from one side of the circle to the other [diamater], passing through the centre point) Example: Circle radius of 5m $= 3.14 \times 5 \times 5$ $= 78.5\text{m}^2$

Set out and prepare the site

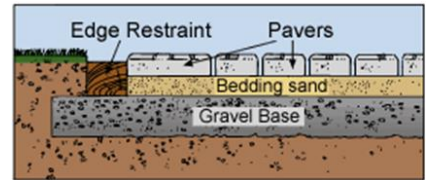
- Follow the steps outlined below when laying pavers:
 - Undertake calculations
 - Area to be paved
 - Materials required (e.g. volume)
 - Volume calculations for common areas

Sub base	Bedding layer	Concrete blend for haunching	Gap sand
Area in $\text{m}^2 \times 0.1$ = Volume (m^3)	Area in $\text{m}^2 \times 0.05$ = Volume (m^3)	• 1m^3 of concrete blend and cement mix will build approximately 200Lm of concrete haunching • For haunching, you will need 12 bags of cement per m^3 of concrete blend to make a suitability strong mix	• Fine beach sand for filling the joints • One 20kg bag is used per 8m^2 of paving area

Activity 7: Select a paver type (with known specifications) and calculate the material costs for a straight path that measures 6m long by 900mm wide

Set out and prepare the site

- Follow the steps outlined below when laying pavers:
 - Prepare paving area and ground
 - Locate services (e.g. telephone, gas, electricity, water, cable, sewerage)
 - Make provision for irrigation lines to cross paved areas
 - Mark out the area and paving pattern according to plans
 - Peg the reduced levels of the proposed area from the survey benchmark using the rise and fall method in a closed level run
 - Excavate area to sub-base level
 - Excavate area to be paved by shovel or machine to the depth of the paver (+5mm if using bedding sand and +1mm for bedding into crusher dust) plus approximately 25-50mm for bedding layer and 75-100mm for subbase layer
 - In most cases this will equate to around 140mm at a minimum
 - Be mindful of the effects of soil disturbance (e.g. disturbance of tree roots)



Set out and prepare the site

- Once the area has been prepared, it is time to bring in the sub base material and bedding materials
 - Place the sub base material evenly over the area and level out compact with a mechanical plate compactor
 - The base must be firm, as paving will only be as good as its foundation
 - This will give a first sub structure to lay your pavers on
 - If installing edge restraints before laying pavers, start laying the soldier course
- Next, place the bedding sand
 - Spread evenly over the area to be paved to a depth between 25-50mm
 - Use screed rails to ensure the bedding course is maintained, allowing around 5mm for paver settlement in the sand when compacted
 - Spread with a rake, don't try to compact the sand at this stage as it doesn't compact in a loose state
 - Set string lines to desired levels and set screed rails accordingly



Implement paving project

- Edge restraints lock pavers into place to prevent their movement
 - Installing before laying pavers
 - Laying an edge course (soldier) provides structure and aesthetics and is usually bedded into a concrete haunch and can aid with screeding.
 - Never lay this course on the bedding layer as it will fail
 - Installing after laying pavers
 - The edge restraints lock the base, sand and pavers all together and prevent lateral movement and slippage
 - The neatest method is a simple concrete haunch which is hidden under surrounding grass, pebble or mulch and added after pavers are laid
 - Dig a trench along the paving edge – it must be deeper than the bedding sand into the subbase
 - Shovel concrete in place, forming against the pavers, allowing sufficient space for soil, mulch, turf and so on
 - Be careful not to disturb the surrounding pavers and get wet concrete on the finished surface



Activity 8: Research the advantages and disadvantages of installing edging before and after laying pavers

- Be sure to allow for fall and drainage
 - The minimum recommended fall is 25mm per 1000mm of span away from your home or structure
 - Crusher dust as a bedding material is good to use for areas that are known to have water flow
 - Set all string lines first to establish a level starting point, then adjust for drainage falls
 - Allow for final paving surface to be below any damp-proof course and weep holes

- When installing drainage, note the effects of altering water flow
 - Be mindful of water pooling in new areas, which may affect nearby plants and structures
 - Ensure that slopes are directed away from buildings
 - Consider infiltration water – water entering the bedding sand must not pond
 - Consider subsurface flow – water from beyond the pavement and flowing under it
 - Consider surface runoff – that water falls directly onto the pavement and flows off the surface
- Poorly planned drainage can result in:
 - Cracking concrete due to erosion under the base material
 - Pavers sinking or moving
 - Excessive weed growth

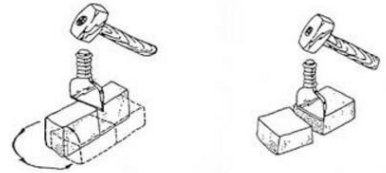
Implement paving project

- When laying pavers, work to the pattern you have chosen by building it forward in rows
 - As you lay each paver, do it carefully so the even bed of sand is not disturbed by the gouging of corners and edges
 - Lower each paver against the face of its neighbour
 - This is called butt-jointing but will actually leave a small gap for filling with gap sand
 - Match sticks are a good gap gauge
- As you work, you can stand or sit on the pavers you have already laid
 - Avoid putting any weight on the leading row, as they may tilt or slip and ruin your sand bed
 - If handy, lay some larger timber over the area to take your weight (e.g. sleepers or ply board)
- A rubber mallet is used to keep a tight pattern bond



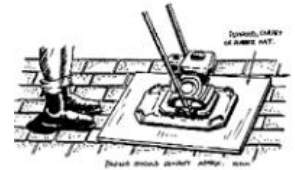
Implement paving project

- As you work you will find you may need to tip or cut pavers to fit into odd shaped areas, around drains or other fixed objects
 - Generally, any paver pattern laid on the 45 degree angle will require twice as many cuts
- There are a number of ways to cut pavers
 - If working with brick pavers, a bolster and hammer should make a sufficient straight edge break
 - For larger format concrete and stone you may need to use a wet brick saw such as a Clipper 350mm diamond brick saw
 - In some cases, particularly if only a few cuts are required, pavers can be cut using a 125mm angle grinder with a diamond masonry blade fitted and a full face mask worn



Implement paving project

- The best way to lock the pavers in firmly after your edging is in place (and dry) is by using a gap filling sand (beach sand)
 - Sweep through a gap filling sand or jointing sand using a soft bristle broom
 - If you have used a brick paver as your design choice, a final compaction with a plate compactor can be done to get complete coverage
 - Make sure you use some sort of protection between the compactor and the bricks to prevent breakage and chipping
 - The compaction will differ, depending on the bedding layer material
 - If sand was used in the bedding layer, you should achieve 5mm compaction
 - If crusher dust was used in the bedding layer, you will achieve 1mm compaction
 - On larger format pavers use a rubber mallet and block of wood for the compaction and vibrating process to reduce the risk of surface damage



Implement paving project

- After sweeping the sand through, lightly moisten the area with a misting from the hose
 - This activates the extra ingredient in sand, which allows it to bind in place as well as filter down and fill the gaps fully
- Once dry you may need to repeat this process a few times to get complete coverage



- It is important to clean the pavers
 - There are a range of products specifically designed to clean, rejuvenate and protect paving products
 - Avoid using acids on pavers, particularly hydrochloric acid
 - Only use acids if you are 100% certain of the correct application and removal process
 - Used incorrectly, acid can and will destroy the surface of your pavers



Activity 9: List environmentally safe products for cleaning

Quality check and clean up

- After completing paving work, you are required to complete the following practices:
 - Compare the quality of the finished works with the drawings and specifications
 - Record and/or report your work outcomes to your supervisor
 - Clean up the work area
 - Shut down, maintain, clean and store plant, tools and equipment
 - Follow manufacturer's specifications and supervisor's instructions
 - Report faults that are discovered in logbook and/or site records



- After completing paving work, you are required to complete the following practices:
 - **Dispose of materials that cannot be reused or recycled**
 - Separate soil and waste material (e.g. organic, inorganic and recyclable piles)
 - Ensure that you follow the enterprise guidelines (e.g. JSA and SWMS for handling and disposing of waste)
 - Follow Safety Data Sheets (SDS) and environmental plans to ensure environmentally safe practices



Activity 10: Have team members take photos and videos of your involvement with paving projects. Be sure to include all stages of construction.

- Paving should be maintained properly
- It is important to provide your client with after care instructions, these may include the following:
 - Check for any vegetative growth and treat with a herbicide
 - Inspect for any fungal growth and treat accordingly
 - Replace any damaged tiles
 - Take note of any paver movement and take corrective measures

Offer your client with a quote for after-installation maintenance services

- To adjust loose pavers:
 - Mark pavers with chalk before lifting, so they can be returned to the same position
 - Lift the pavers and clean all the loose debris from the space
 - Place a layer of double-washed river sand down, pushing it right up to the edges and into the corners with a wooden float.
 - Compact the sand by treading it down
 - Check that the level is uniform across the base of the sand
 - Replace the pavers
 - Evenly space each paver and match the chalk markings
 - Top-dress the pavers with very fine sand
 - Give the pavers a tap with the mallet to settle the sand in and sweep it off