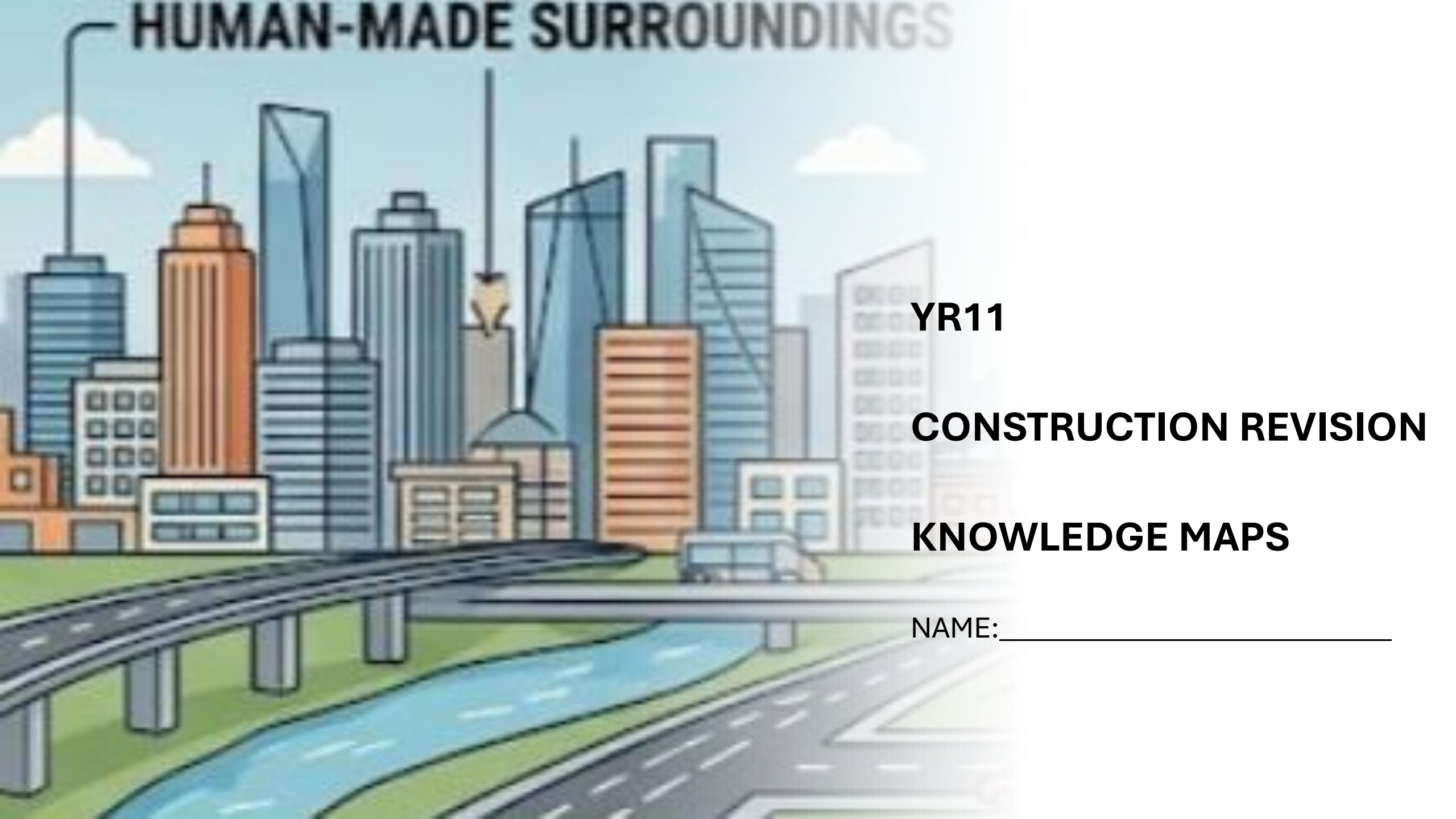


HUMAN-MADE SURROUNDINGS

A stylized illustration of a city skyline. In the foreground, a multi-lane highway bridge spans a blue river. The bridge has several grey support pillars. To the right of the bridge, a road leads towards the city. The city itself is composed of various buildings: some are tall and modern with blue glass facades, while others are shorter and more traditional with orange or brown facades. A yellow crane is visible among the buildings. The sky is light blue with a few white clouds. The overall style is clean and modern.

YR11

CONSTRUCTION REVISION

KNOWLEDGE MAPS

NAME: _____

THE CONSTRUCTION SECTOR (Unit 1.1)

1 THE BUILT ENVIRONMENT

HUMAN-MADE SURROUNDINGS

Includes:

- BUILDINGS
- INFRASTRUCTURE
- SERVICES



2 BUILDINGS & STRUCTURES

RESIDENTIAL



HOUSE

- House
- Homewoom
- Hedlory build



FLATS

- Flats
- Thur flats
- Prepportions

NON-RESIDENTIAL



SCHOOL

- School



OFFICE

- Office block
- Office block : laboratory
- Hospital hospital



HOSPITAL

TYPICAL COMPONENTS

WALLS

FLOORS



ROOF STRUCTURE

NOOORS

OPENINGS
(DOORS, WINDOWS)

3 INFRASTRUCTURE & CIVIL ENGINEERING



Roads and motorways



Railways



Bridges and tunnels



Water supply and sewerage



Electrical grids



LARGE-SCALE,
PUBLIC-USE
PROJECTS

Telecommunications

4 BUILDING SERVICES

MECHANICAL



HEATING



VENTILATION
(HVAC UNIT)



AIR
CONDITIONING



LIFTS/
ESCALATORS

ELECTRICAL



LIGHTING



POWER



POWER



ALARMS



IT NETWORKS

PUBLIC HEALTH



WATER SUPPLY



DRAINAGE



WASTE
REMOVAL



PROFESSIONAL & MANAGERIAL ROLES IN CONSTRUCTION (Unit 1.1)

1

WHY ROLES MATTER



- Projects are complex
- Different specialists handle:

→ **DESIGN** 
→ **COST** 
→ **SAFETY** 
→ **CONSTRUCTION**

3

3. SITE & CONTRACTS MANAGER



- Manages day-to-day site work
- Organises labour & materials
- Oversees progress
- Responsible for **health & safety**



2

KEY PROFESSIONAL ROLES (1)

ARCHITECT



CIVIL / STRUCTURAL ENGINEER



NON-STRUCTURAL

- Designs buildings 
- Meets client needs
- Produces drawings
- Manages design stage

- Ensures strength & stability
- Designs structural solutions
- Follows Building Regulations
- Assesses risk



4

4. KEY PROFESSIONAL ROLES (2)

SURVEYOR



- Surveys land 
- Measures sites
- Sets out buildings

QUANTITY SURVEYOR (QS)



- Manages costs 
- Controls budgets
- Pays subcontractors
- Produces final accounts

KEY ROLES IN CONSTRUCTION

1. THE DESIGNER / ARCHITECT

1. THE DESIGNER / ARCHITECT

NEW BUILDINGS / RENOVATIONS

DETAILED DRAWINGS FOR CONTRACTOR

MEETS CLIENT & REGULATION REQUIREMENTS

Client Regulations Environmental requirements

MANAGES POST-DESIGN STAGES

Project Project timeline Construction milestone Construction milestones

2. CIVIL & STRUCTURAL ENGINEER

2. THE CIVIL & STRUCTURAL ENGINEER

DESIGNS, PLANS & MANAGES CONSTRUCTION PROJECTS

construction site Project plan

SOLVES DESIGN & DEVELOPMENT PROBLEMS

Problem-solving

PRODUCES STRUCTURAL SOLUTIONS (DESIGN CODES)

British Standards

ASSESSES POTENTIAL TENTIAL RISKS

Potential construction hazards

3. CONTRACTS MANAGER & SITE MANAGER

COORDINATES CONSTRUCTION SITE ACTIVITIES

Manager Master schedule

MANAGES SITE PROGRESS & MEETINGS

Progress chart Group meeting

ORGANISES RESOURCES (LABOUR, PLANT, MATERIALS)

Labour Plant Neat

UNDERTAKES DAY-TO-DAY SITE ACTIVITIES

Common & tasks

RESPONSIBLE FOR H&S AND WORKER WELFARE

First-aid Safety Rest area

4. THE SURVEYOR

SURVEYS LAND & MEASURES EXISTING FEATURES

Total station

SETS OUT CONSTRUCTION WORKS (DRAWINGS & SPECIFICATION)

Precise Site setting out marks Finished site data Site plan

5. THE QUANTITY SURVEYOR

FINANCIAL MANAGEMENT OF A PROJECT

MAKES PAYMENTS TO SUBCONTRACTORS & SUPPLIERS

PRODUCES A FINAL ACCOUNT

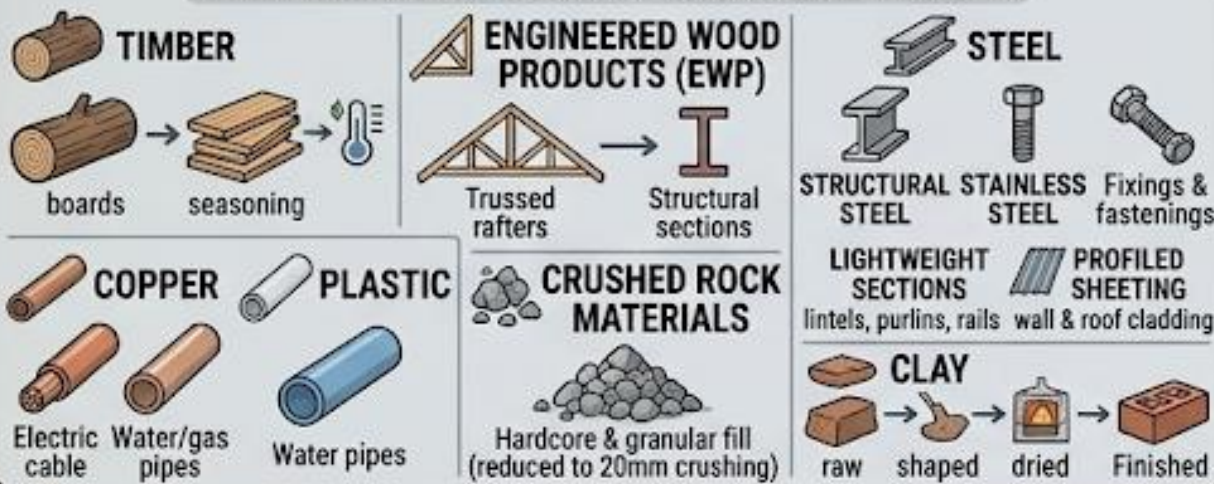
Final Account

CONTROLS BUDGETS & COSTS

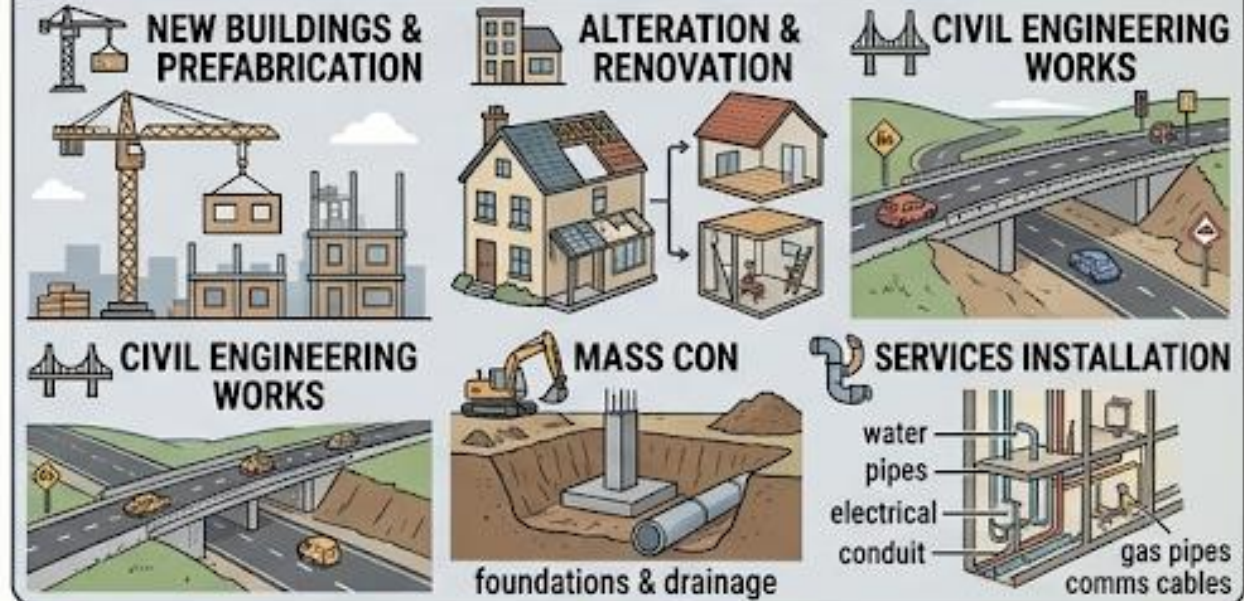
KEY STAGES IN THE BUILT ENVIRONMENT LIFE CYCLE

1. MANUFACTURING:

TRANSFORMATION OF RAW MATERIALS



2. CONSTRUCTION ACTIVITIES

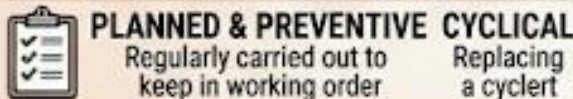


3. OPERATION & MAINTENANCE

OPERATION CAN INVOLVE:



MAINTENANCE MAY TAKE FORM OF:



BUILDING O&M MANUAL

- Given to client/user on completion
- CDM Regs relevant sections
- Contains operation, maintenance, decommissioning & demolition info



4. DEMOLITION & WASTE HANDLING

PRE-DEMOLITION PLAN INCLUDES:



PROCEDURES INCLUDE:



5. DISPOSAL, REUSE OR RECYCLING

WASTE HANDLING CHOICES



SUSTAINABLE CONSTRUCTION

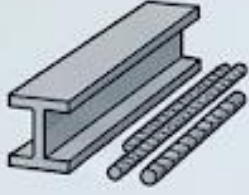
Specifying materials that are sustainable & renewable from managed sources

MATERIALS, DEMOLITION & WASTE (Unit 1.2)

1. KEY CONSTRUCTION MATERIALS



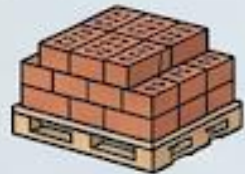
• **TIMBER**



• **STEEL**



• **CONCRETE**



• **BRICKS**



• **PLASTICS**



EXAM FOCUS

- Sustainability links = high marks
- Recycling benefits = common exam question

2. MATERIAL FOCUS: CONCRETE & STEEL

CONCRETE

Made from:



CEMENT

+



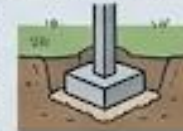
WATER

+



AGGREGATE

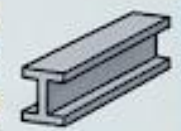
Used for:



FOUNDATIONS



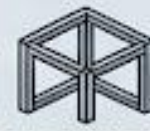
FLOORS



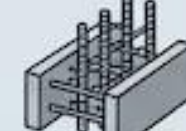
BEAMS

STEEL

Used for:



STRUCTURAL FRAMES



REINFORCEMENT



FIXINGS



Strong and durable.



Flexible and beams.



Strong set of critents materts and dorants.

3. DEMOLITION PLANNING



INCLUDES:

- ☒ identification of hazards (e.g. asbestos)
- ☒ disconnection of utilities
- ☒ site security
- ☒ dust suppression



4. WASTE MANAGEMENT OPTIONS

DISPOSAL



Landfill

REUSE



bricks



slates



steel sections

bricks, slates, steel sections

RECYCLING

Recycling



crushing,
sorting,
smelting



crushing



sorting



smelting



TYPES OF BUILDING & STRUCTURE (Unit 1.3)

1. RESIDENTIAL & AGRICULTURAL

RESIDENTIAL BUILDINGS



Houses



Flats

- Places of habitation
- Houses and flats
- Often small scale
- High demand in the UK

AGRICULTURAL BUILDINGS



Farming barn



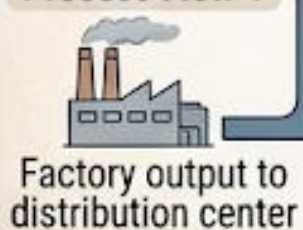
Rural cottage

- Farming related
- Rural locations
- Traditional or modern designs

3. INDUSTRIAL & COMMERCIAL (2)



Process Flow 1



Factory output to distribution center



Industrial



Commercial

FEATURES OF INDUSTRIAL & COMMERCIAL:

- ✓ Factories
- ✓ Warehouses
- ✓ Large scale
- ✓ Often on industrial parks
- ✓ Usually in town centres
- ✓ Profit making use

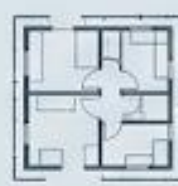
2

2. BUILDING FOCUS: RESIDENTIAL & COMMERCIAL

RESIDENTIAL



House front



Floor plan



Street Flats

- Places of habitation
- Houses and flats
- Small scale



Profit making use and centres

COMMERCIAL BUILDINGS



Shops



Offices



- Shops
- Offices

Profit making use and centres



- Profit-making use
- Usually in town/city centres

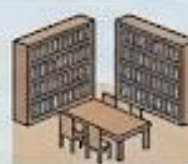
4

4. COMMUNITY & RELIGIOUS & RECREATIONAL

COMMUNITY BUILDINGS



Schools



Libraries



Leisure centres

- Libraries
- Recrer centres
- Leisure centres

Used by local communities



RELIGIOUS BUILDINGS



Mosque



church



temple

RECREATIONAL BUILDINGS



Sports halls



Cinemas



Leisure complexes



FURTHER BUILT ENVIRONMENT CONCEPTS (WJEC Level 1/2)

1. FURTHER BUILDING TYPES

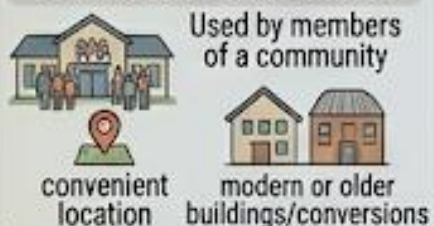
INDUSTRIAL BUILDINGS



AGRICULTURAL BUILDINGS



COMMUNITY BUILDINGS



RELIGIOUS BUILDINGS

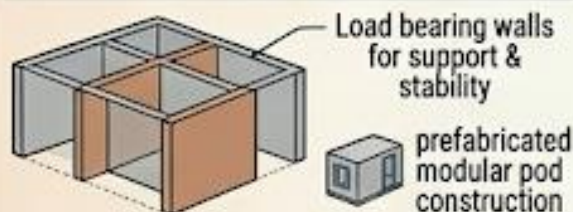


RECREATIONAL BUILDINGS

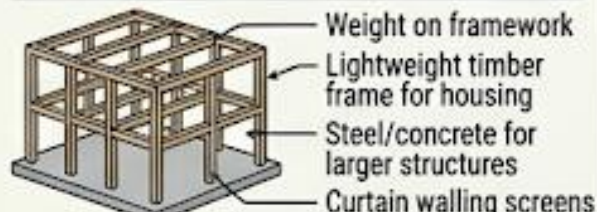


3. BUILDING STRUCTURES & FORMS

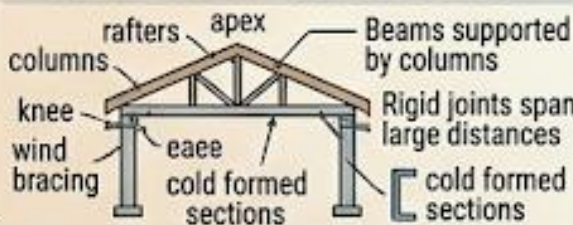
CELLULAR CONSTRUCTION



RECTANGULAR FRAME CONSTRUCTION



PORTAL FRAME CONSTRUCTION



HERITAGE & TRADITIONAL METHODS



2. TECHNOLOGIES & MATERIALS - LOW-RISE ELEMENTS

NEW TOP SECTION MAIN ELEMENTS & COMPONENTS (low-rise)



MODIFIED BOTTOM SECTION MATERIAL FOCUS: Constructing & Services

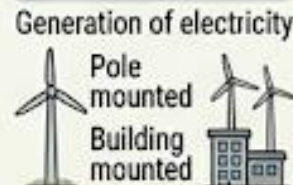


4. RENEWABLE TECHNOLOGIES

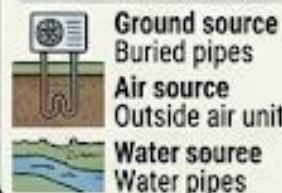
SOLAR ENERGY



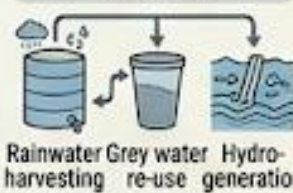
WIND TURBINES



HEAT PUMPS



WATER



5. SUSTAINABLE CONSTRUCTION METHODS

BENEFITS OF SUSTAINABLE CONSTRUCTION



POLLUTION, HABITATS & SUSTAINABLE MATERIALS



NEW 'PLANNING & SITE SELECTION' SECTION



INFRASTRUCTURE & SYNOPTIC REVIEW (Unit 1.3)

1. INFRASTRUCTURE & BENEFITS

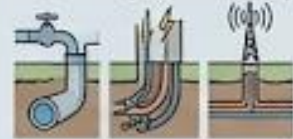
INFRASTRUCTURE CONSTRUCTION

Roads and motorways

Railways

Bridges and tunnels

Utilities (water, electricity, telecoms)



BENEFITS OF INFRASTRUCTURE



Economic growth



Improved transport



Better access to services



Job creation

3. SYNOPSIS: INFRASTRUCTURE & COMMUNITY



PROJECT PLANNING & EVALUATION



PROJECT PLANNING & EVALUATION



Project Approval Process

DRAWBACKS OF INFRASTRUCTURE:

- ✓ Environmental damage
- ✓ Pollution and noise
- ✓ Community disruption
- ✓ Loss of habitats



2. BUILDING FOCUS: INFRASTRUCTURE IMPACTS

INFRASTRUCTURE FOCUS



synoptic map view

URBAN IMPACT



Noise barriers



New utility substation

- Projects are complex
- Multi-specialist involvement (design, safety, construction)
- Long timescales
- Higher complexity and risk

RURAL & ENVIRONMENTAL IMPACT



Large scale



Wind turbine farm



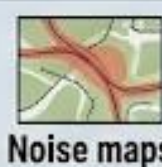
- Large scale, visible
- Environmental implications
- Conflicts of interest
- Balance of benefits vs. drawbacks

4. EVALUATION & COMMUNITY DISRUPTION

INFRASTRUCTURE PROJECTS ARE CONTROVERSIAL



Public meeting



Noise maps



Disrupted residential



Alternative routes

BENEFITS

(e.g., job creation, better transport)



Fast train

DRAWBACKS

(e.g., noise, community disruption)



Traffic noise



Closed shop

MUST BE BALANCED AGAINST DRAWBACKS

MUST BE BALANCED AGAINST DRAWBACKS

