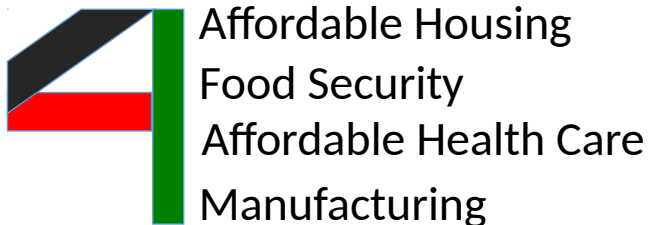


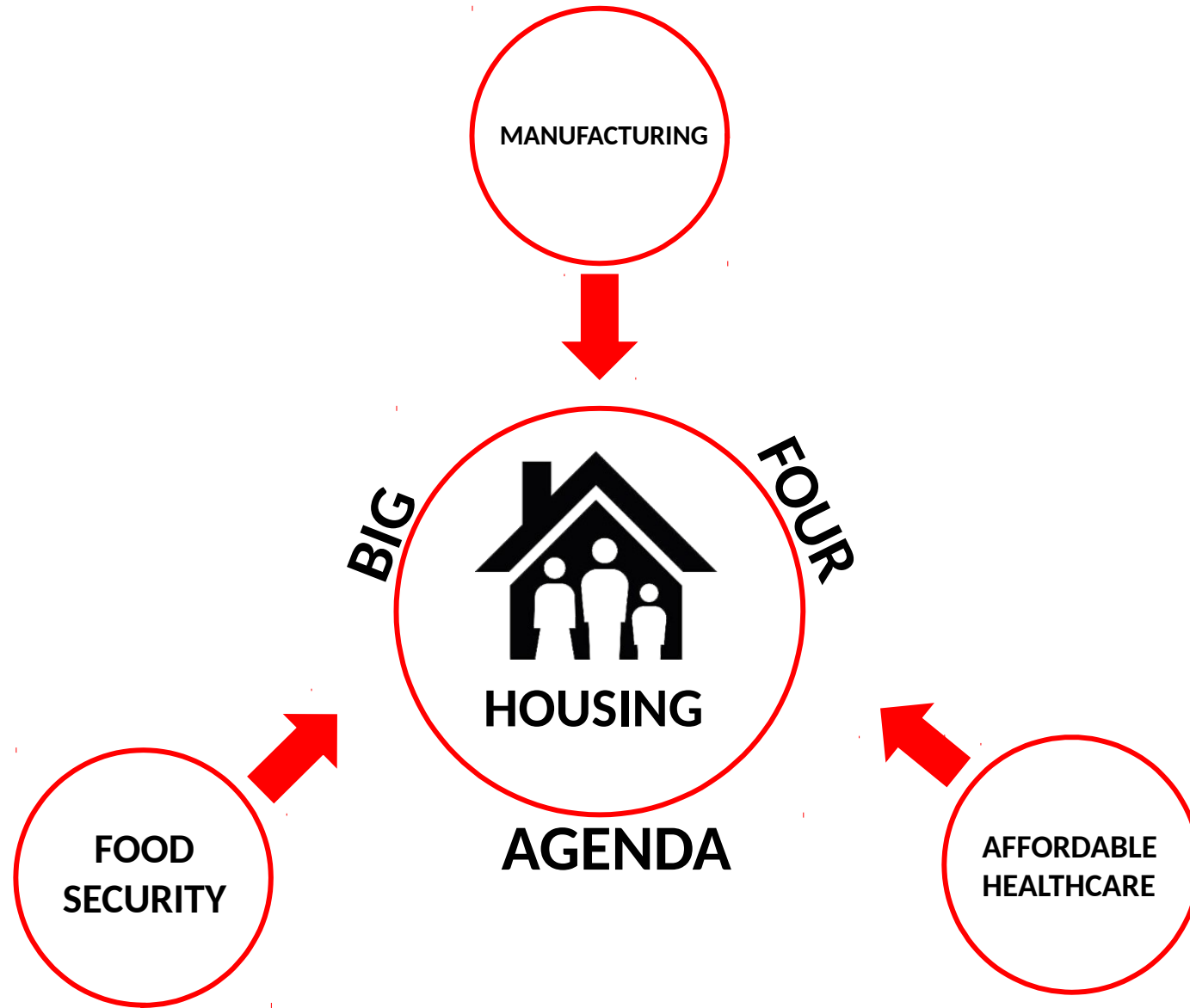


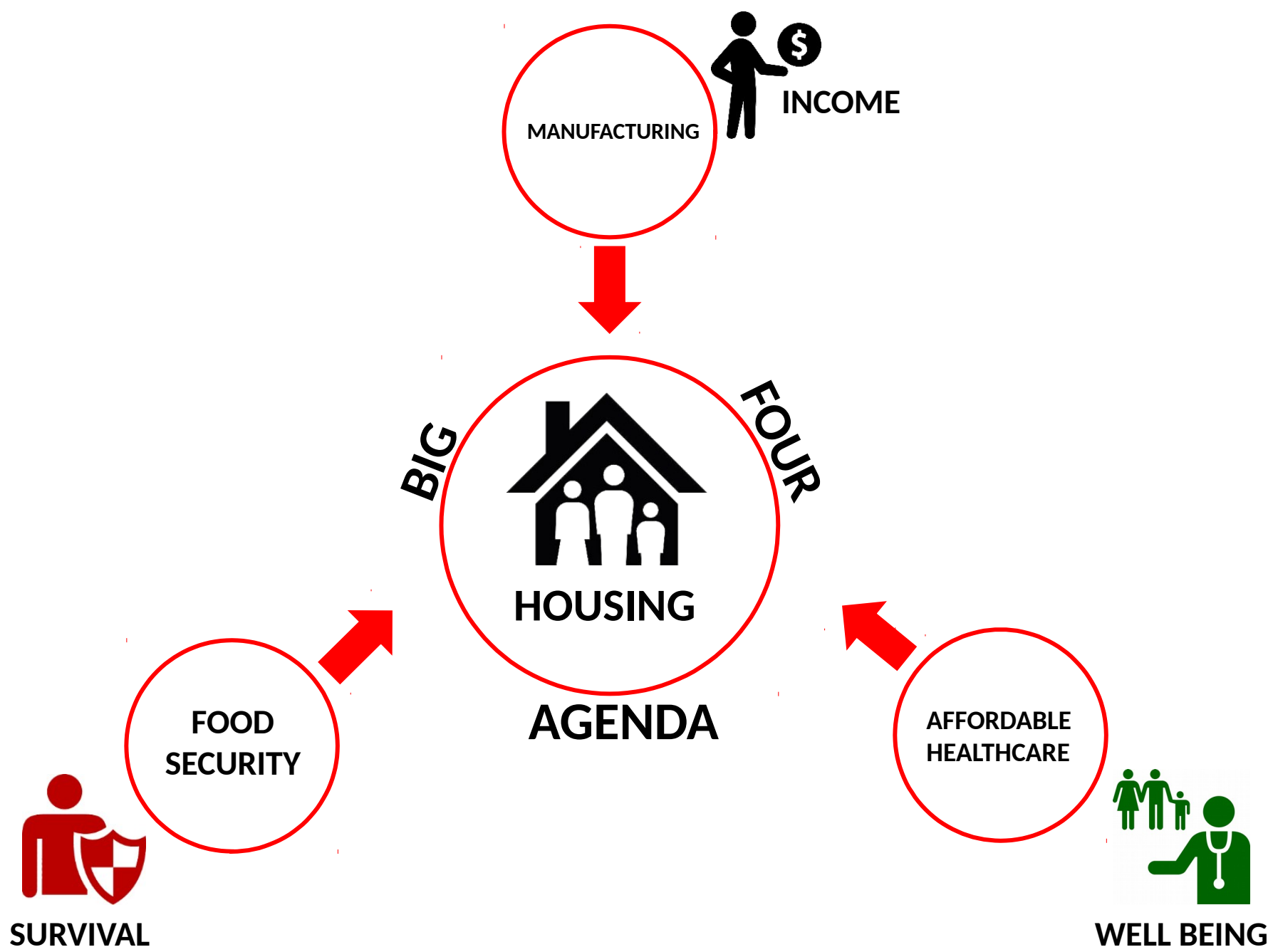
How Quality of Plastics Can Aid Affordable Housing

Presented By Dominic J Majendie



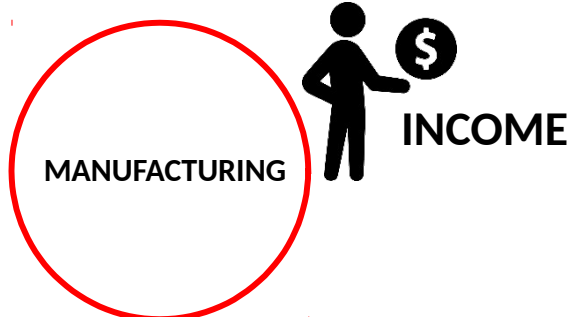






INFRASTRUCTURE : ENABLING

- ROADS & PORTS
- MOBILE INTERNET & COMMS
- NIGHT LIGHTING & SECURITY
- AGRICULTURE & LAND
- AQUIFERS, RESERVOIRS
- INDUSTRIAL PARKS



INFRASTRUCTURE : INSTITUTIONS

- SCHOOLS
- HOSPITALS
- MARKETS
- ENTERTAINMENT
- CHURCHS/MOSQUES
- PARKS



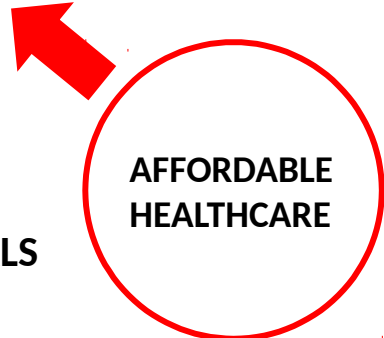
AGENDA

INFRASTRUCTURE : FUNDAMENTALS

- CLEAN AIR
- CLEAN WATER
- STORM DRAINS
- SEWAGE DISPOSAL
- ELECTRICITY
- GARBAGE REMOVAL/RECYCLING



SURVIVAL



WELL BEING



AFFORDABLE HOUSING

- High Income : Can afford international products and luxurious quality
- Medium Income : Can qualify for and afford regular Mortgages and good quality
- Low Income : Should have assistance to qualify for mortgage, low cost housing
- Very low income : Cannot usually afford a mortgage low rent accommodation



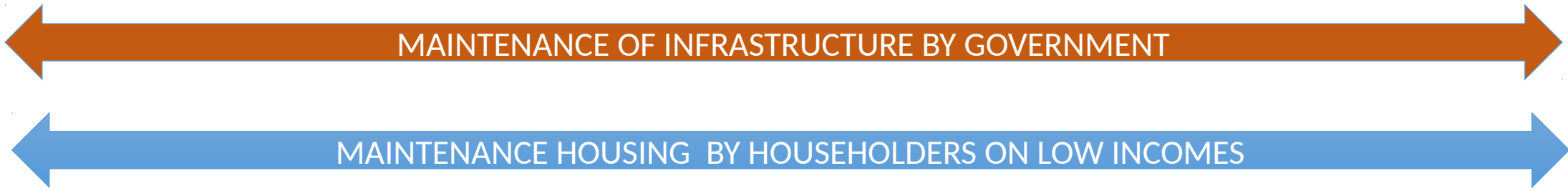
AFFORDABLE HOUSING : FOR LOW INCOME FAMILIES

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AFFORDABLE HOUSING : FOR LOW INCOME FAMILIES

Government Investment



4 YEARS	40 YEARS	40 YEARS	40 YEARS
CONSTRUCTION	MAINTENANCE	MAINTENANCE	MAINTENANCE



AFFORDABLE HOUSING

Government Investment

1. COST AND TIME MOST CRITICAL FOR THE GOVERNMENT

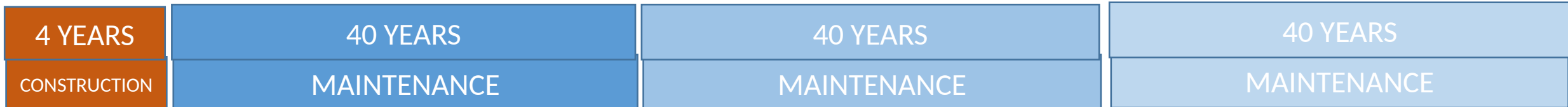


INNOVATIVE NEW TECHNOLOGY
Reducing construction time,
Lowering costs,
Houses a growing population

2. END USER MAINTENANCE:
CHEAP, EASY AND
WITHOUT DEPENDANCE



BUILDING TECHNIQUES EASY TO LEARN
MATERIALS LOCALLY AVAILABLE
Local labour force must be trained
to build and maintain





PLASTICS IN AFFORDABLE HOUSING: WHERE TO USE THEM?

1. INNOVATIVE USE OF PLASTICS

All or part of the Entire House.

2. ESSENTIAL UTILISATION OF PLASTIC:

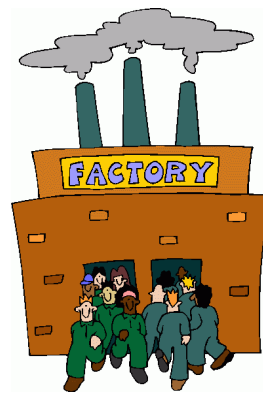
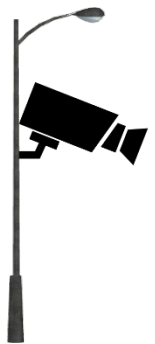
Potable Water, Drainage, Ducts and Electrical Fittings.

CONSTRUCTION

MAINTENANCE

RECYCLING

BACK TO BASICS: PLASTICE OF THE INFRASTRUCTURE



ROAD

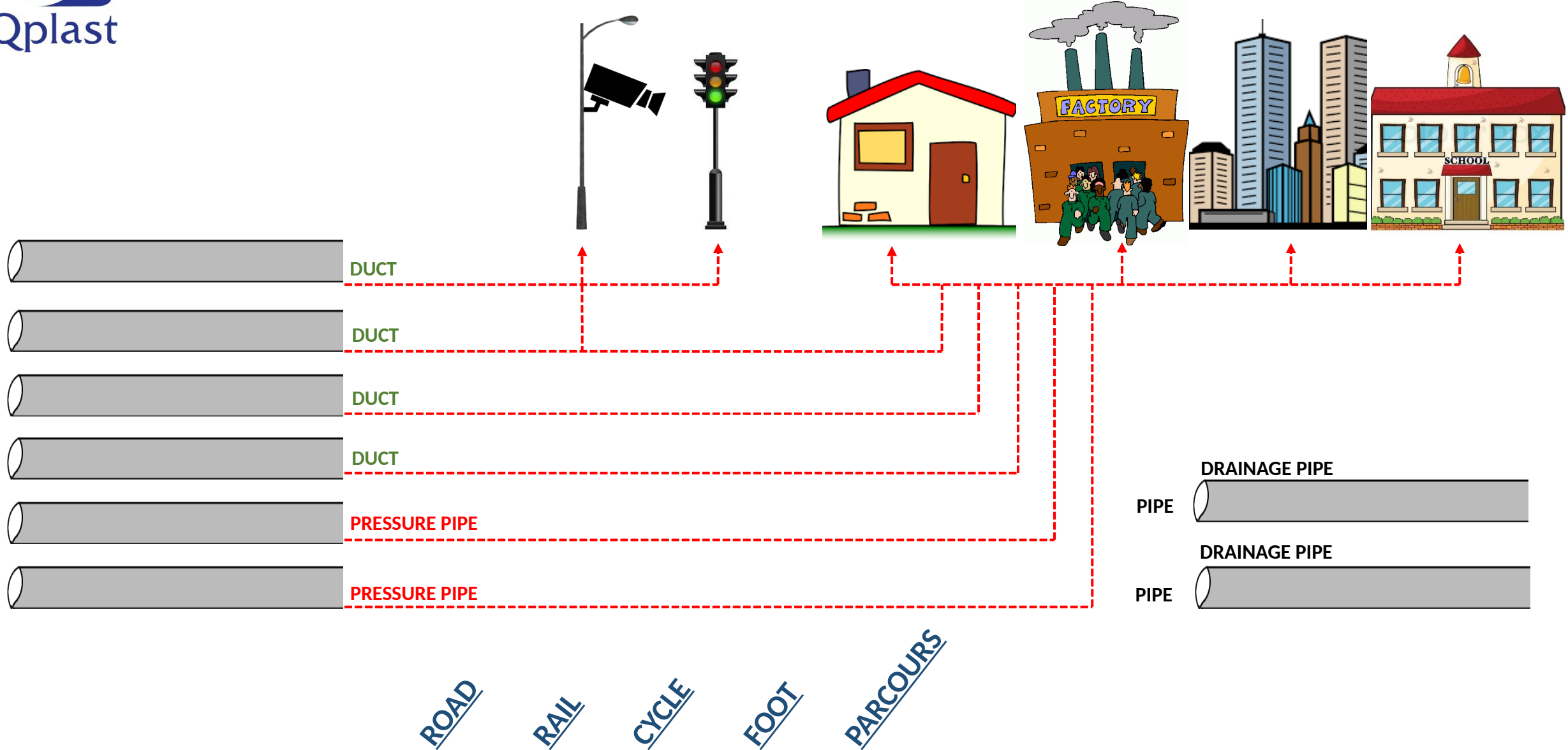
RAIL

CYCLE

FOOT

PARCOURS

BACK TO BASICS: PLASTICE OF THE INFRASTRUCTURE





**PRESSURE PIPE
WATER**

**UNDERGROUND
DRAINAGE**

**ABOVEGROUND
DRAINAGE**

DUCTS

**MARKING TAPES
MARKING TILES
FOR PIPES & DUCTS**

**SLEEVINGS &
PROTECTIONS**



The Role of the Standard, - Policing Quality

**PRESSURE PIPE
WATER**

DUCTS

**UNDERGROUND
DRAINAGE**

**ABOVEGROUND
DRAINAGE**



**PRESSURE PIPE
WATER**

BSEN 1452 & DIN 8062
u-PVC Pressure Pipe and
Fittings

DUCTS

Single, Multi, Arranged, etc
CONDUITS, ELECTRICAL DUCT,
FIBRE OPTIC DUCT, ETC

**UNDERGROUND
DRAINAGE**

BS EN 1401
u-PVC Under Ground Drainage
Pipe and Fittings

**ABOVEGROUND
DRAINAGE**

BS EN 1329
u-PVC Above Ground Drainage
Pipe and Fittings

**PRESSURE PIPE
WATER**

**BS EN 1452 & DIN 8062
u-PVC Pressure Pipe and
Fittings**



**UNDERGROUND
DRAINAGE**

**BS EN 1401
u-PVC Under Ground Drainage
Pipe and Fittings**



**ABOVEGROUND
DRAINAGE**

**BS EN 1329
u-PVC Above Ground Drainage
Pipe and Fittings**





What happens if the Standard is not met?

The Problem of Poor Quality Plastics in Construction

Polyethylene

Polypropylene

Polyvinyl Chloride



Required Tests

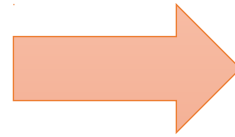
BSEN 1452 & DIN 8062
u-PVC Pressure Pipe and Fittings



PRESSURE TESTING

- ✓ Tensile Strength
- ✓ Vicat Softening Point
- ✓ Reversion
- ✓ Impact
- ✓ Opacity
- ✓ Pressure Test (Long term)
- ✓ Ring Stiffness
- ✓ Dichloromethane
- ✓ Elongation

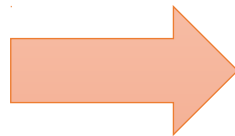
BS EN 1401
u-PVC Under Ground Drainage Pipe and Fittings



UNDERGROUND TESTING

- ✓ Vicat Softening Point
- ✓ Reversion
- ✓ Impact
- ✓ Pressure Test (Long term)
- ✓ Ring Stiffness
- ✓ Dichloromethane
- ✓ Elongation

BS EN 1329
u-PVC Above Ground Drainage Pipe and Fittings



TESTING

- ✓ Impact
- ✓ Pressure Test (Long term)
- ✓ Dichloromethane
- ✓ Opacity
- ✓ Reversion
- ✓ Vicat Softening Point



Factory Qualification

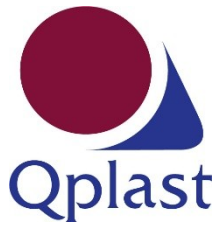
- Verification to see that the production facility is properly equipped, especially for test equipment, ISO certification, etc.

Product Qualification

- Long term testing
- Raw material certification
- **EXAMPLE:** Hydrostatic pressure test 1000 Hrs for pipes, Hydrostatic testing 5000Hrs for raw materials recipe changes.

Product Acceptance Testing (Batch Testing)

- Regular Production Batch Test
- Tests: Impact, Dichloromethane, Dimension, Reversion, Opacity, Hydrostatic Pressure (1Hr), Vicat Softening, Fitment, Ring Stiffness, Tensile Strength, Elongation, Leak, Bending.



Who is to blame for for failures?