Construction Partners Presentation
Work Package 6
CS4, CS5, CS6, CS7 & CS8

Remade South East, Bauserve, CEIFA and Wilding Butler

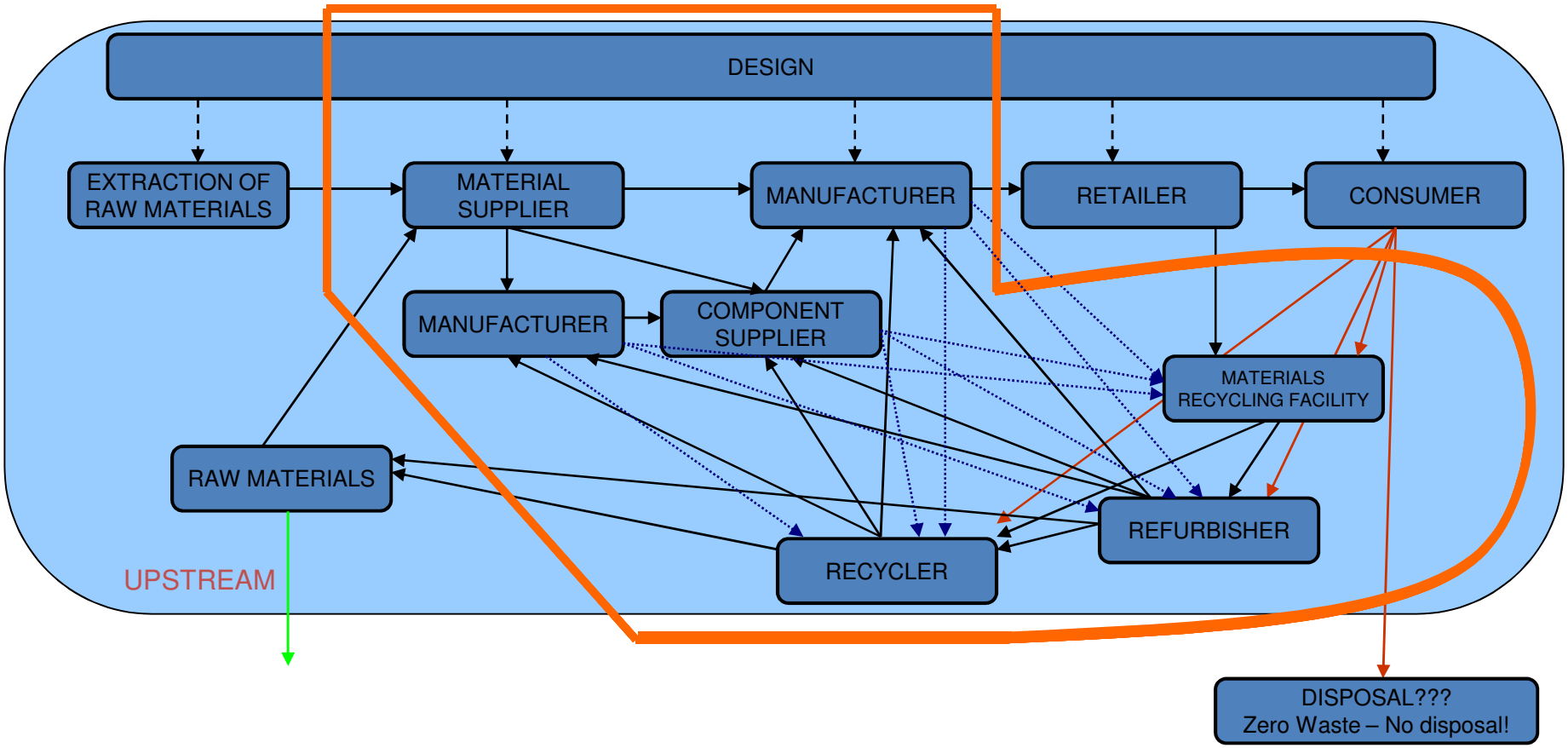
Programme

- Introduction — Diana Lock, Remade SE
- CS4 & CS7 — Remade SE & Wilding Butler
- CS6 — Bauserve
- CS5 & CS8 — CEIFA
- Working with other ZeroWIN partners
- Questions

Introduction

- Goal of the Case Study
- Progress achieved
- Baseline scenario
- Main environmental impacts (CO2, waste, water)
- Proposed activities
- Identified and potential symbioses
- Links to WP3 studies
- Work plan for the next year with deadlines and tasks for individual partners

ZEROWIN SCOPE AND BOUNDARIES 5



NOTES:

•The manufacturers product the final product but also they origin waste materials / sub products that shall be considered (blue dotted arrows)

•It was decided in the Bilbo meeting that there should not be a distinction between upstream and downstream cluster, seen as before and after the consumer.

•In the next slides there is a suggestion for the appliance of this scheme to the construction sector (construction and demolition case-studies).

Case Study CS4
Remade SE & Wilding Butler

Step By Step, Mixed Development, Aldershot, UK

The Construction Team are as follows –

- Client- Sentinel Housing Association
- End User – Step by Step (SBS)
- Main Contractor – Wilding Butler
- Building Services Engineer- PJR Services
- Architectural Services- Re Format
- Structural Engineer – CSC Ltd
- Clients Representative – Madlin & Maddison

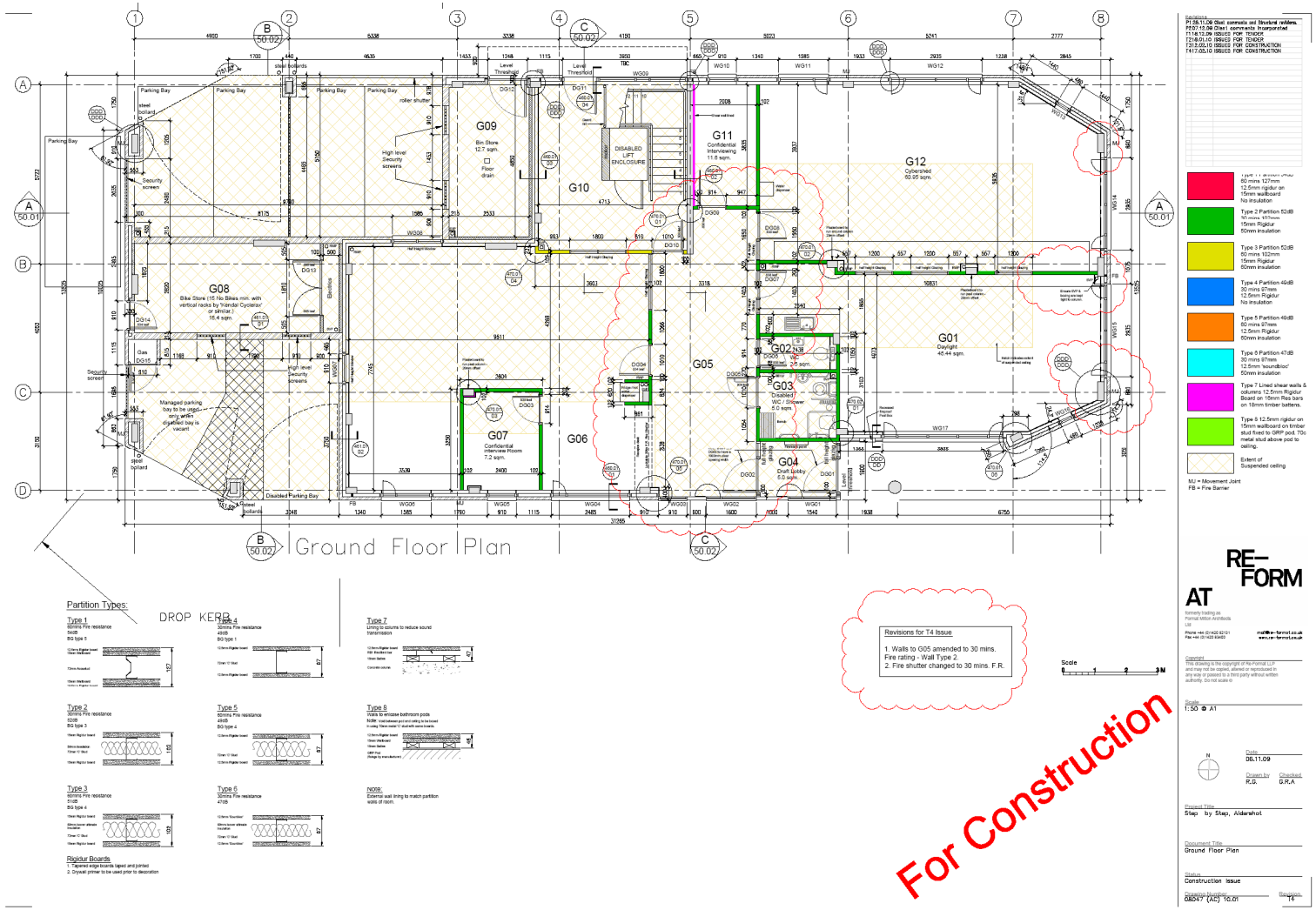

Corridor ADV
Corridor ADV
Handrail to roof hatch
Corridor ADV
U/S Roof slab
Third Floor FFL
Contrasting brickwork spandrel panel (typical)
Second Floor FFL
First Floor FFL
Ground Floor FFL 85.800
Step by Step
Timber bench with proprietary s/s & glass shelter over. TBC
Grade 86.100
Bollards
Bollards
South Elevation
For Tender
RE-FORM
AT
Date 12.11.09
Drawn by C.R.A.
Checked R.G.
Project Title Step by Step, Aldershot
Drawing Title ELEVATIONS
Status Tender Issue
Revision T1

Key Objectives

- It should be safe for both clients and staff
- Any increase in rent, maintenance and running costs from the old buildings to the new should not exceed the additional client rents generated by the 3 extra bedrooms in the new building. An important factor in this will be the building and its fixtures and fittings being robust enough to withstand rough handling by young people and minimise maintenance costs
- The clients should like the new building and their behaviour should respond positively and it should be an enjoyable place for SBS staff to work
- The expected 2 x fte staff productivity gains should be achieved and result in better outcomes for clients
- The building's appearance should underpin the support the charity receives from the local community.

Building Layout

- Third floor - stage 2 accommodation
- Second floor - stage 1 accommodation
- First floor - interview suite, storage and administration.
- Ground floor - client support services


Ground Floor Plan
G01
G02
G03
G04
G05
G06
G07
G08
G09
G10
G11
G12
For Construction
Revisions for T4 Issue
1. Walls to G05 amended to 30 mins. Fire rating - Wall Type 2.
2. Fire shutter changed to 30 mins. F.R.
Partition Types:
DROP KERB
Rigidur Boards

Construction

- Concrete Pad and Strip Foundations
- Ground Floor insitu reinforced concrete slab
- Reinforced concrete frame, insitu slabs and roof.
- Metsec Frame Inner Leaf (Forms a framed steel stud structure which is fixed between the main frame members and provides a carrier for insulation cladding and plasterboard and minimises wet trades)
- Brickwork/Cladding External Leaf
- Single Ply Membrane Roof
- Metal Stud Partitions internally, insulated & plasterboarded
- Powder Coated Aluminum Windows (South facing windows to have suncool glass to reduce solar gain)

- Bathroom Pods
- Under floor Heating Systems
- Screeded Floors
- Substantial Mechanical & Electrical Installations
- Full Carpentry and Joinery works.
- Furniture fit out to bedrooms.
- External works including secure car and bike parking.

Energy Use

- High thermal efficiency walls, windows and roof via high levels of insulation
- High efficiency boilers and a Combined Heat and Power ('CHP') unit to increase energy efficiency and reduce running costs
- A building with a high thermal mass to smooth temperature fluctuations and keep it cool in summer
- Special glass in all south-facing windows to reduce solar heat gain
- Natural ventilation rather than air conditioning, with cooling probably only in the equipment room

- Under floor heating, controlled by SBS staff and not clients, and set to achieve room temperatures of (probably) 19 degrees centigrade plus or minus 2 degrees in all occupied rooms and 10 degrees plus or minus 2 in storage areas
- Meters in all stage 2 bedrooms to encourage clients to use energy efficiently
- Energy efficient lighting throughout
- ecolabelled white goods throughout, with the possible exception of the stage 1 laundry, where robust 'industrial' washing machines will be essential.

Water Use

- Dual flush toilets
- 6-9 litres/minute reduced-flow showers
- Flow reducing/aerating taps
- 60 litre maximum volume washing machines in the stage 2 laundries
- A water butt at the west end of the building to collect rainwater for watering the garden area.

Noise Reduction

- Concrete floors with acoustic insulation
- A high level of sound insulation in all internal partitions, which will be multilayer and incorporate air gaps and offset studs to prevent direct transmission of vibration through them
- Bedroom doors with acoustic insulation to help protect sleepers from disturbance
- Door closers which do not slam doors
- Sound absorbing ceilings in corridors
- Service ducts designed not to transmit noise between rooms
- Carpets to absorb sound in corridors and most communal areas

Monitoring of water, energy and waste

- Both energy and water use will be measured on site via meters from a local supplier.
- Wilding Butler partner with a recycling/waste disposal company who will provide data
- All suppliers and sub contractors will provide data for their works
- Wilding Butler will endeavour where possible to engage local suppliers within a given radius to minimise energy use.
- Wilding Butler will endeavour to negotiate a ‘take back’ scheme with local suppliers who, if surplus material is left after completion of each item will reuse/sell on to other contractors therefore reducing waste costs.

- Wilding Butler, in association with other partners will input waste information into the BRE Smartwaste Site Waste Management Plan system.
- Wilding Butler will investigate off site production methods to reduce on site energy, water and waste. These include the use of Bathroom Pods, Doorsets, bespoke kitchens and bedroom furniture.

Progress to date

- Site clearance completed
- Foundations completed
- Ground slab completed
- Concrete frame ongoing

- Data collected so far;

  Fuel used by temporary generator

  Electricity used for temporary site offices and welfare facilities

  Water used, metered at site boundary

  Waste generated from current site operations

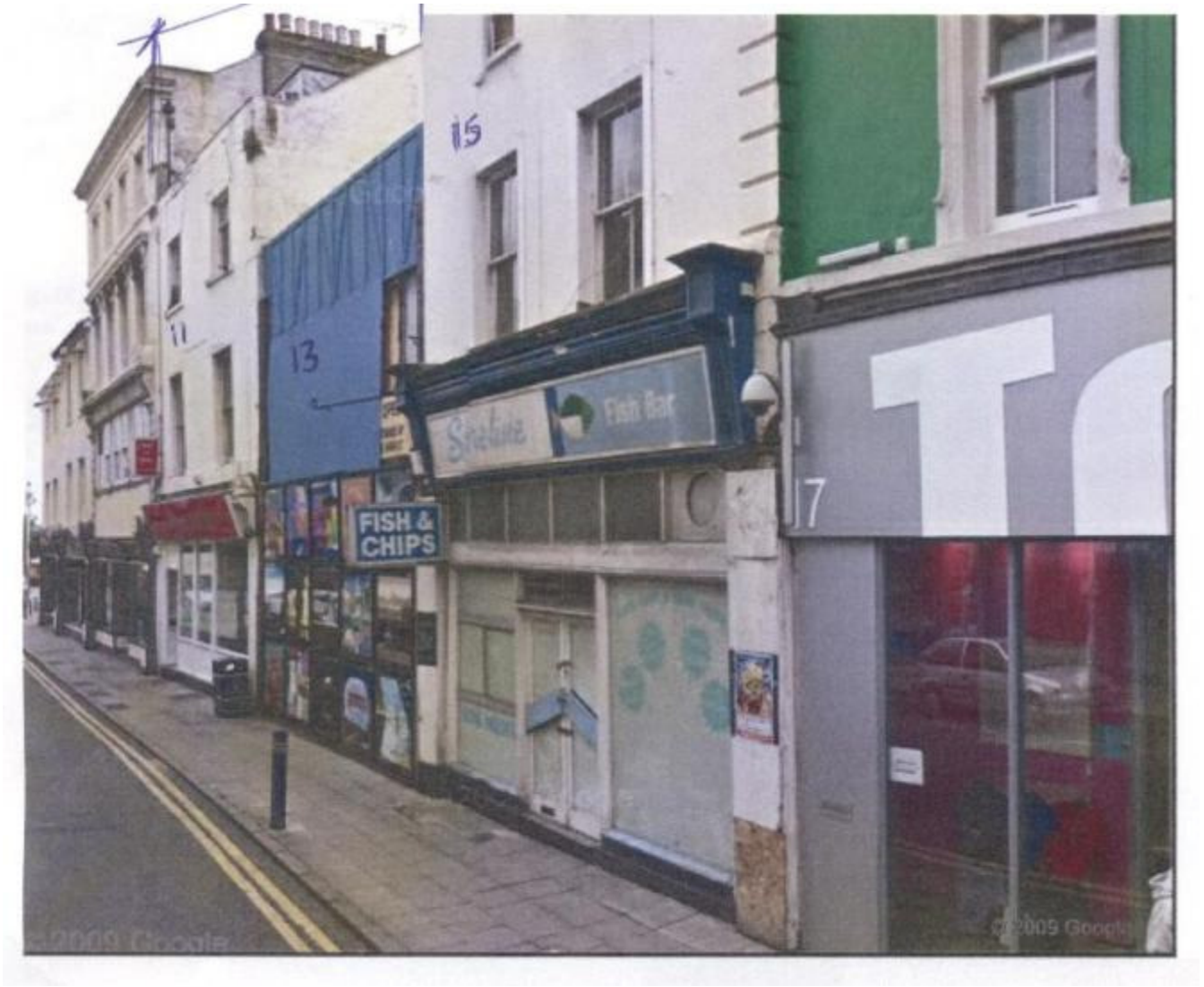
Actions	Deadline
Definition of the stakeholders to involve in the CS	September 2010
Identification of a proper site construction site	September 2010
Identification of key processes (the ones with greater impact and the ones we may influence)	September / October 2010
Establishment of the comparable baseline scenario for the case study (based on historical data)	October 2010
Identification of the networks involved in the selected processes	October / November 2010
Identification of existing industrial symbioses and unexploited potentials	October / November 2010
Identification of actions to promote industrial symbioses and the achievement of the environmental targets	November / December 2010
Preparation and implementation of the network actions and site monitoring / data collection	From December 2010 throughout the duration of the construction

Case Study 7
Remade SE

Demolition of 11-13 Tontine Street, Folkestone, Kent, UK

The Development Team are as follows –

- Client – Creative Foundations
- Architect – Jonathan Stuckey Architects
- Demolition Contractor – Yet to be appointed


15
13
11
FISH &
CHIPS
Fish Bar
17

- Load-bearing brick construction
- Timber floors and roof structure
- Sand/cement render to external walls
- Steel cladding to part of one elevation
- Shop-front glazing
- Bitumen flat roof coverings
- Roof tiles
- Internal plasterboard partitions
- Floor coverings
- Ceiling tiles
- Heating, plumbing, sanitaryware and electrical fittings
- Sundry internal finishes

- Remade South East have been written in to the demolition brief and will be assisting with the following;
  - pre-demolition audit of waste materials arising
  - assessment of GHG emissions during demolition
  - assessment of energy use during demolition
  - assessment of water use during demolition
  - assessment of and collection of waste data
  - assistance with reuse and recycling outlets
  - benchmarking of data for future projects

Goal of the Case Study

- Capture the waste materials expected during demolition
- Identify potential outlets for reuse and recycling of those materials
- Record logistics and time schedule for the demolition
- Identify issues regarding the network of stakeholders involved
- Investigate the capacity and availability of end markets for demolition materials
- Identify the needs and constraints within the sector for the implementation of demolition protocols

Materials to be segregated on site

- Bricks
- Timber
- Metal
- General hardcore/concrete/bricks
- Roof tiles
- Plasterboard
- Glass
- Sanitaryware

Progress achieved

- Demolition tenders due 9th July
- Appointment of contractor 23rd July
- Assessment of material arising w/c 26th July
- Commence demolition 2nd August
- Completion demolition 1st September
- Review of arisings w/c 1st September
- Initial report 17th September

Baseline scenario

- Demolition of Victorian school, Hythe, Kent, UK
- Bricks, 50% reused on site, 50% crushed for road base
- Wood, 25% reused, 75% incinerated (power from waste)
- Hardcore, 100% recycled on site
- Roof tiles, 100% reused on site
- Plasterboard, 100% recycled
- Glass, 100% recycled
- Sanitaryware, 100% reused

- Mixed waste sent to a local waste transfer station
- 75% recycling rate (UK average 55%)
- Only 9 tonnes of waste sent to landfill
- Almost 900 tonnes of waste reused or recycled
- 99% reuse/recycling rate

Savings

- Reduced number of containers
- Reduction of landfill tax paid
- £70,000 (approx 87,000 Euros)
- 176 less vehicle movements

Next Steps

Actions concerning current sites	Deadline
Baseline scenario for the case study (based on historical data)	July / August 2010
Identification of key processes (the ones with greater impact and those we may influence)	July / August 2010
Identification of existing industrial symbioses and unexploited potentials	August 2010
Identification of actions to promote industrial symbioses for the achievement of the environmental targets	August 2010
Implementation of network actions and site monitoring / data collection	September 2010

bauserve
DIENSTLEISTUNGEN

Case Study 6

Challenge

- **Coordination of different actors** due to single contract arrangements
- opportunity to create:

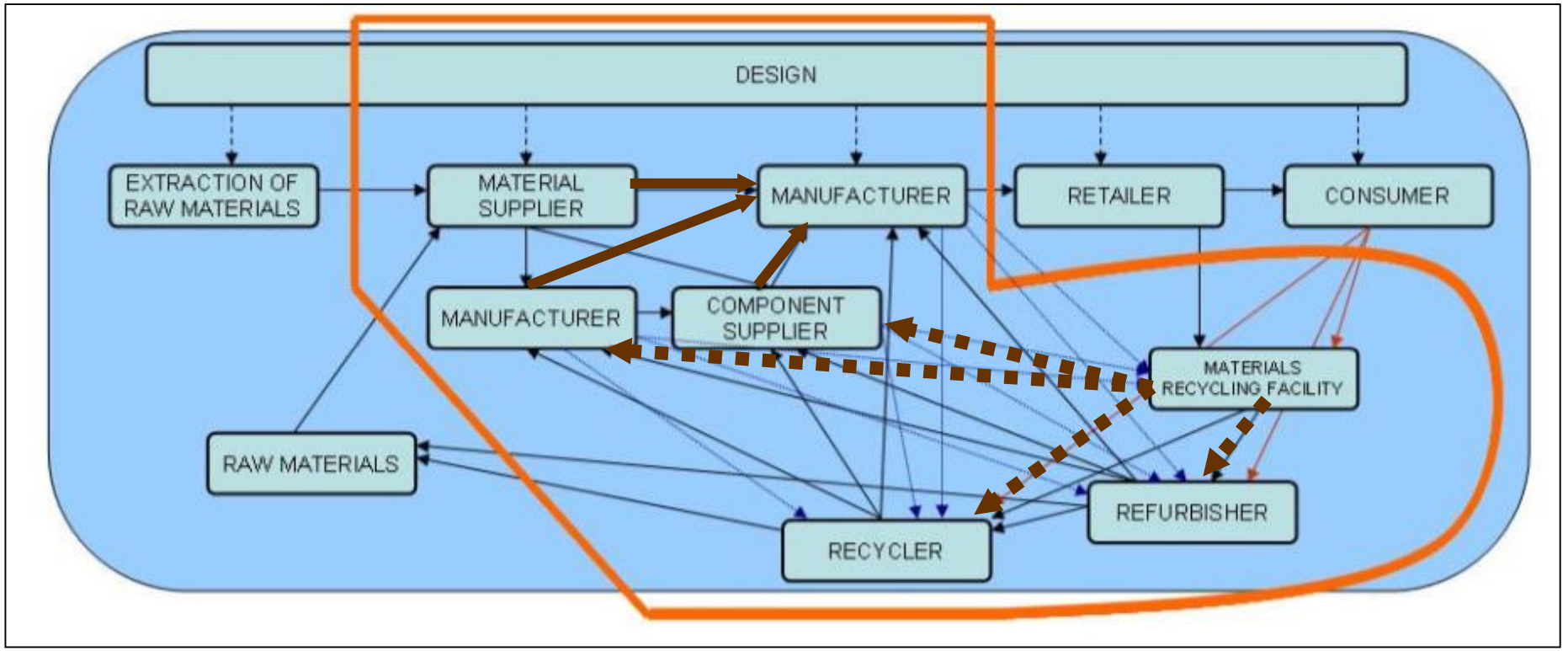
  common removal systems and

  economies of scale for recycling & reuse
- economical & ecological **efficiency of handling secondary resources within Industrial Networks,** generated by construction projects.

Goals

- Examination of **different life cycle phases of two construction projects** for its potentials of designing and implementing an **Industrial Networks around a construction project**
- **Main target:** optimized logistical supply chain of both delivery and disposal causing an economical & ecological efficient structure of an Industrial Network

Focus in the scope and boundaries



Boundaries of the system

Direct impact by activities of bauserve

Indirect impact by activities of bauserve

Case Study 6

Projects

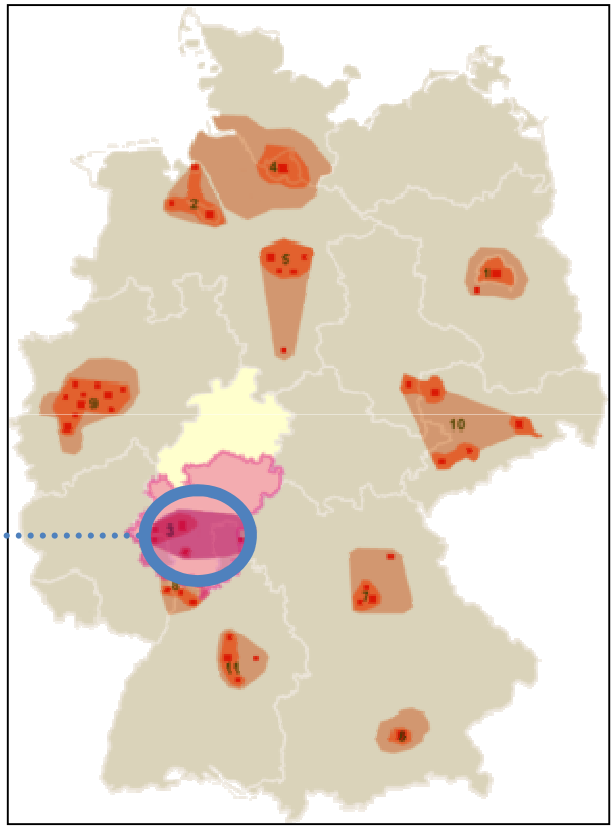
Project I

Refurbishment of the Deutsche Bank headquarter

in Frankfurt am Main

Project II

New Construction: still open



Rhine-Main Metropolitan Region

- Second largest metropolitan region in Germany
- Productive industry, banking, trade and logistics
- Strong railway connection

➢ **Best requirements** to expose and establish **network structures** within an industry and between different industry sectors

Project I | manufacturing process

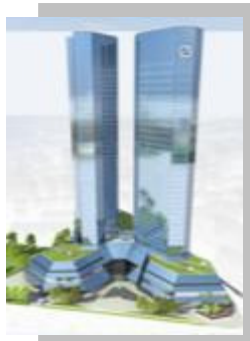
Defining the **manufacturing** process

Existing building

[high-rise building]




1	**Gutting-phase** Seperating old materials from the building
2	**Construction-phase** Installation of new materials / components into the gutted building



Refurbished building

[high-rise building]

- Duration 48 months
- Gross floor area [m²] 120.000 m²
- height of physical structure 155 m

"...Deutsche Bank's Head Office, its prominent 155-metre twin towers in Frankfurt am Main, Germany, are undergoing **Europe's largest building renovation** …"

[Source: Deutsche Bank | Fact Sheet | page 1]

Project I | activities

TARGETS




- Decrease of at least 30% greenhouse gas emissions
- **70% of overall re-use and recycling** of waste
- Reduction of at least **75% of fresh water utilization**

Through

Industrial Symbiosis | Industrial Networks

Manufacturing Phase

Case study

Increasing the demand for recycled materials in construction by using pre-consumer content and post-consumer content

Possible baseline

…

…

- will be filled in until Southampton meeting -

Project I | activities

TARGETS




- Decrease of at least 30% greenhouse gas emissions
- **70% of overall re-use and recycling** of waste
- Reduction of at least **75% of fresh water utilization**

Through

Industrial Symbiosis | Industrial Networks

Manufacturing Phase

Case study

Increasing demand for building materials and products that are extracted and manufactured within the **Region**

Possible baseline

…

…

- will be filled in until Southampton meeting -

Project I | activities

TARGETS




- Decrease of at least 30% greenhouse gas emissions
- **70% of overall re-use and recycling** of waste
- Reduction of at least **75% of fresh water utilization**

Through

Industrial Symbiosis | Industrial Networks

Manufacturing Phase

Case study

Optimizing transportation of (1) materials to and (2) waste from the construction site

Possible baseline

…

…

- will be filled in until Southampton meeting -

Project I | activities

TARGETS




- Decrease of at least 30% greenhouse gas emissions
- **70% of overall re-use and recycling** of waste
- Reduction of at least **75% of fresh water utilization**

Through

Industrial Symbiosis | Industrial Networks

Manufacturing Phase

Case study

Just in time manufacture and delivery

Possible baseline

…

…

- will be filled in until Southampton meeting -

Project I | activities

TARGETS




- Decrease of at least 30% greenhouse gas emissions
- 70% of overall re-use and recycling of waste
- Reduction of at least **75% of fresh water utilization**

Through

Industrial Symbiosis | Industrial Networks

Manufacturing Phase

Case study

Waste separation already **on construction site** into several waste fractions

Possible baseline

…

…

- will be filled in until Southampton meeting -

Project I | activities

TARGETS




- Decrease of at least 30% greenhouse gas emissions
- 70% of overall re-use and recycling of waste
- Reduction of at least **75% of fresh water utilization**

Through

Industrial Symbiosis | Industrial Networks

Manufacturing Phase

Case study

Selecting qualified downstream companies | preferably from the vicinity of the construction site project

Possible baseline

…

…

- will be filled in until Southampton meeting -

Project I | activities - summary

Increasing the demand for recycled materials in construction by using post-consumer content and pre-consumer content

Increasing demand for building materials and products that are extracted and manufactured within the **Region**

Optimizing transportation of (1) materials to and (2) waste from the construction site

Just in time manufacture and delivery

Waste separation already on construction site into several waste fractions

Selecting qualified downstream companies | preferably from the vicinity of the construction site project

Project I | activities - current

Increasing the demand for recycled materials in construction by using post-consumer content and pre-consumer content

Increasing demand for building materials and products that are extracted and manufactured within the **Region**

Optimizing transportation of (1) materials to and (2) waste from the construction site

Just in time manufacture and delivery

Waste separation already on construction site into several waste fractions

Selecting qualified downstream companies | preferably from the vicinity of the construction site project

Project I | activities - current

Waste separation already on construction site into several waste fractions

Selecting qualified downstream companies | preferably from the vicinity of the construction site project

- **71 different waste fractions**
- **Summarizing to 26 waste fractions** | EWC
- For each waste fraction:

  Analysis of main process steps in cooperation with data collecting sheet from *boku* and additional with own **data sheets**

  ON construction site

  OFF construction site

Project I | activities - current

Collecting & separating waste
ON construction site

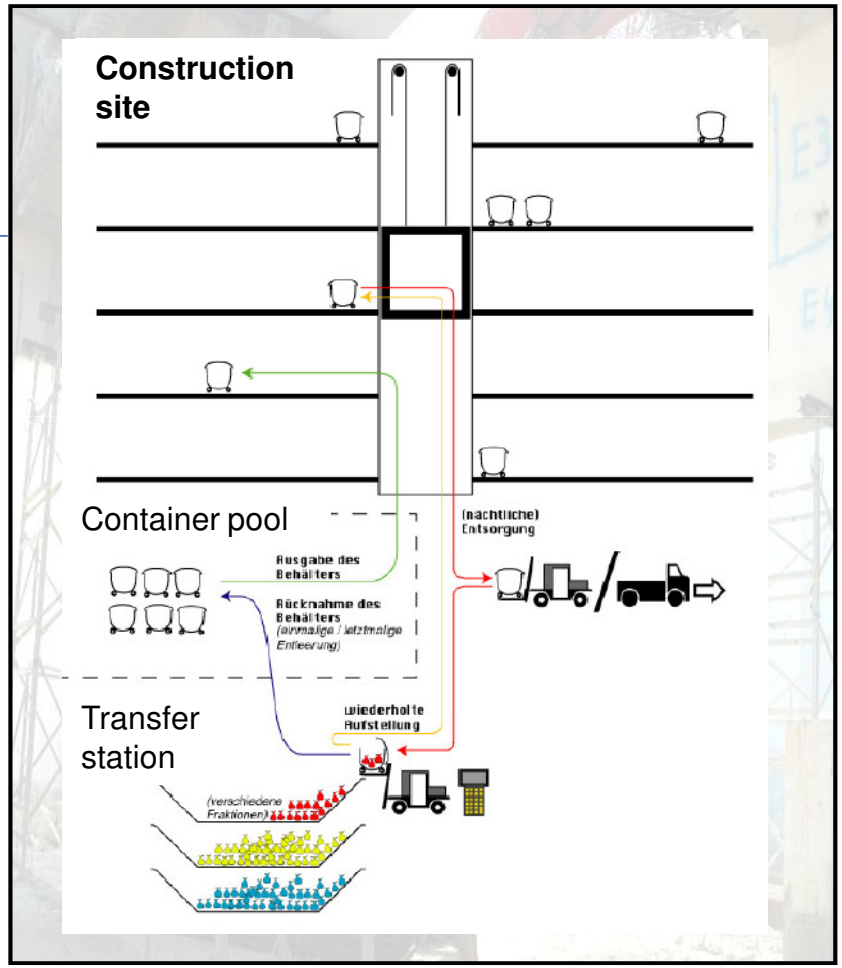
Reverse Logistic: project refurbishment Deutsche Bank headquarter | may 2010

data collection ON construction site

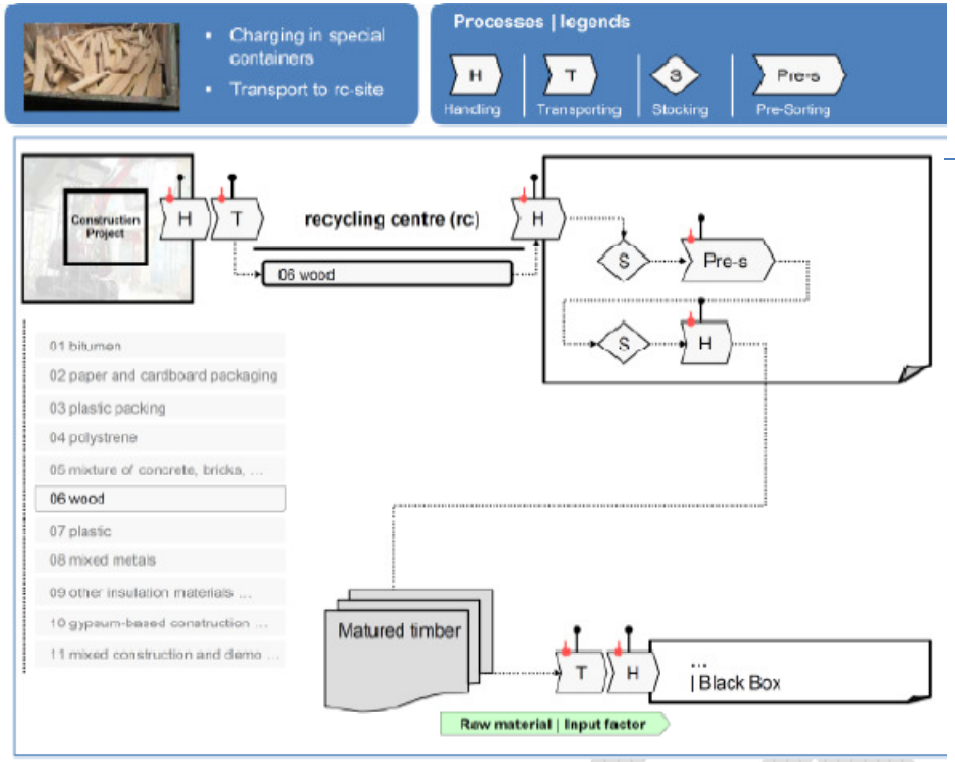
	EWC | number	name
waste fraction		
waste management by ... *(company)*		
collection system | collection box	volume [m³]	

waste disposal process

	process steps	duration	transport vehicle ressource	weight	energy consumption		emissions	
					manufacturer information	total	conversion factor	total
		[h]	type	[to]	[l/h] [kW]	[l] [kWh]	[g/l] [g/kWh]	[g]
1								
2								



Project I | activities - current



Transporting & treating waste
OFF construction site

Reverse Logistic: project refurbishment Deutsche Bank headquarter | may 2010

data collection OF construction site

	EWC	number	name
waste fraction			
waste management by ... *(company)*			
waste stream	Re-use	Recycling	Disposal

waste disposal process

	process steps	distance duration	transport vehicle ressource	weight	energy consumption		emissions	
					manufacturer information	total	conversion factor	total
		[km] [h]	type	[to]	[l/tokm] [l/h] [kW]	[l] [l] [kWh]	[g/l] [g/l] [g/kWh]	[g]
1								
2								

Approach of Industrial Network | Industrial Symbiosis

- To be completed by Bauserve-

Summary

…

- To be completed by Bauserve-

…

…

Workplan | for next year

- Defining project II | new construction
- Defining a baseline scenario for case study 6
- Material flow analysis | actions:

  Defining the relevant process steps: project case study - baseline scenario
- Analysing potentials for fresh water reduction

Case Study 5 – CEIFA
Goals

- Build stakeholders networks involved in a construction project and identify with them their perception of suitable best practices
- Identify in the construction site the processes suitable for intervention (great impacts and possibility to improvements), in order to promote industrial symbiosis → environmental gains consistent with the call targets

  For that it is necessary to establish a **baseline scenario**

- Identify economic opportunities and barriers to cooperative working within zero-win strategies

Case Study 5 – CEIFA

Progress Achieved

- Search for an adequate construction site selected – delays from the industrial partners:
  - General crisis is delaying construction investments
  - In some cases, there is a new trend for refurbishment rather then new construction
  - The existing stakeholder (EDIFER) does not have a proper construction site at the moment
- Waiting for the official involvement of *other stakeholders* to define a construction site
  - Several contacts with public entities and construction companies and interest demonstrated from some departments
  - Waiting for official approval in one case

Case Study 5 – CEIFA

Environmental Impacts and Baseline Scenario

- Building indicators for waste production, energy and water consumption (contacts with construction companies), in order to establish a proper baseline scenario according to the methodology defined (*case specific baseline scenario*)

Case Study 5 – CEIFA

Work plan for next year

Actions	Deadline
Definition of the stakeholders to involve in the CS	September 2010
Identification of a proper site construction site	September 2010
Identification of key processes (the ones with greater impact and the ones we may influence)	September / October 2010
Establishment of the comparable baseline scenario for the case study (based on historical data)	October 2010
Identification of the networks involved in the selected processes	October / November 2010
Identification of existing industrial symbioses and unexploited potentials	October / November 2010
Identification of actions to promote industrial symbioses and the achievement of the environmental targets	November / December 2010
Preparation and implementation of the network actions and site monitoring / data collection	From December 2010 throughout the duration of the construction

Case Study 8 – CEIFA
Goals

- Provide information on how the role of the planning phase for the reduction of environmental impacts of demolition
- Study the relative opportunities and barriers for reduction, reuse and recycling of secondary materials
- Highlight best practices and identify areas where improvements can be made
- Identify, in the selected site, the processes suitable for intervention (great impacts and possibility for improvements), in order to promote industrial symbiosis → environmental gains consistent with the call targets.
  For that it is necessary to establish a **baseline scenario**

Case Study 8 – CEIFA

Progress Achieved

- Analysed Sites:
  - Demolitions of tow high schools (Portuguese Program for rehabilitation of high schools): *Escola Secundária da Maia* and *Escola Secundária de Paços de Ferreira* (both near to Oporto)
- Industrial Partner:
  - General contractor – EDIFER (project stakeholder)
- Current stage of the CS:
  - collection of demolition data for the baseline scenario, together with the involved actors
  - identification of key processes and the networks involved
  - identification of documentation failures
- A third demolition site will be added in the next months

Case Study 8 – CEIFA
Progress Achieved (cont.)

- Demolition in *Escola Secundária de Paços de Ferreira* completed – information collected will be used to establish the baseline scenario
- A further demolition will happen in September in *Escola Secundária da Maia*
- Systematisation of information for the baseline scenario
- Identification of actions to be implemented in order to achieve the environmental goals (soon)

Case Study 8 – CEIFA

Environmental Impacts

- Demolition activities have specific impacts:
  - Demolition has minor impacts on resource depletion than construction
  - In some cases, there are huge water consumptions for dust control and other activities - fresh water wasted
  - Depending on the selected demolition processes, there may be great energy consumptions for the used equipments / tools / machinery
  - The most immediate and significant environmental impacts from demolitions are those related to waste management

Case Study 5 – CEIFA

Baseline Scenario

- The selected sites have specific characteristics because they are school buildings
- The first demolition provided information for the building of the baseline scenario (*case specific baseline scenario*)
- It was not possible to collect accurate data for energy and water consumption
  - There is a general metric equipment for the hole site, several works are developed simultaneously and it was not accepted to have specific metrics for the specific works
- The information is currently being gathered and summarized with BOKU's template

Case Study 8 – CEIFA

Work plan for next year

Actions concerning current sites	Deadline
Baseline scenario for the case study (based on historical data)	July / August 2010
Identification of key processes (the ones with greater impact and those we may influence)	July / August 2010
Identification of existing industrial symbioses and unexploited potentials	August 2010
Identification of actions to promote industrial symbioses for the achievement of the environmental targets	August 2010
Implementation of network actions and site monitoring / data collection	September 2010

Case Study 8 – CEIFA

Work plan for next year

Actions concerning a third site – Required	Deadline
Definition of the stakeholders to involve in the CS	December 2010
Identification of a proper site	December 2010 / January 2011
Identification of key processes (the ones with greater impact and those we may influence)	January 2011
Establishment of the baseline scenario for the case study (based on historical data)	April 2011
Identification of the networks involved in the selected processes	April 2011
Identification of existing industrial symbioses and unexploited potentials	May / June 2011
Identification of actions to promote industrial symbioses and the achievement of the environmental targets	June / July 2011

Working with other ZeroWIN partners

- Wilding Butler
- University of Southampton
- BOKU

Questions