PETUS description of tool in use	
Name of the case	**Lyon Confluence - Storm Water Management**
Name of the tool	**Evaluation Grid**
Country	France, Rhone Alpes, Greater Lyon
City / region Total area (km2) Population Density (people/km2)	City: Lyon: 1.2 million of inhabitants, 500 km² (25 km in length and 25 km in width), 8700 inhabitants/km² Greater Lyon: urban community constituted by 55 municipalities including Lyon and it is the second most important urban agglomeration in France. Region: Rhône-Alpes, ranked in second place through the 22 French regions for population and surface area criteria.
Tool user's profile a. Organisation name (municipality, NGO, national or regional department, company, etc.) b. Field of activity c. Detailed contact/feedback (project website, e-mail, address, tel., fax)	a. Water Department of the Greater Lyon b. In charge of studies, constructions and management of water infrastructures for the Greater Lyon. c. Elisabeth Sibeud Head of the design section of the water department of the Greater Lyon Email : esibeud@grandlyon.org
Reviewer, date	INSA-Lyon, France, Last update March 2005

Short description of the case

"Lyon Confluence" is one of Greater Lyon's biggest projects. It is a long-term project, planned until 2030. Located between two rivers, Rhône and Saône, and long restricted to industry and transport facilities, the Perrache peninsula is undergoing a transformation. The impacts on Lyon vitality and way of life for the Greater Lyon's inhabitants are significant. And that's why it represents a great challenge that the city should overcome.

We propose another view of this project which was a building & land use approach: study of the whole urban renewal operation. That's why we recommend reading the both case studies in order to tackle the project as a whole.

As far as water management is concerned, a preliminary study was done in several steps: inventory and diagnosis of existing networks, definition of objectives, definition of means, and decisions on orientations.
The diagnosis has raised some particular points to take into consideration: maintenance difficulties, existence of nuisances and troubles, and pollution of the receiving bodies. It has then been decided that proposed solutions should (definition of objectives):

- Enhance the receiving bodies quality and then protect the water resources
- Reduce the flooding risks
- Reduce operation and investment costs
- Integrate storm water management in cityscape.

The means and orientations that have then been established advocate technical solutions that:

- Build a separate sewer system only in new zones
- treat the storm water as close to the source as possible
- develop simple projects easy-to-understand for citizens
- propose a sewer network with high slope value and without pumping station.

At this stage, 13 solutions have been defined by the design section of the Greater Lyon water department. In order to evaluate and compare them in regard with sustainability, a grid has been developed by the project engineer. The assessed criteria are social, environmental, economical and governance ones (limitation of waste production, limitation of investment cost, reduction of work hardness…). Nevertheless due to time and human resources needed, the grid had no significant impact on the decision making process. It is hoped that in the future the grid might be developed and used on other cases.

This case was chosen because "Lyon-Confluence" is a large renewal project of an old industrial district into a downtown one. Due to its central position, the project has grown up in a particular political context where general stakes were highly important for Lyon influence, and where political forces have already shown their interest in sustainability.

The first approach of this project was a building & land Use one: the entry point was the study of the whole neighbourhood rehabilitation (see case study "Lyon Confluence major urban development"). And then it appears that the combination of a sector specific case study (concerning water management) combined with a building & land use one was relevant. That's why we recommend reading the both case studies in order to have a whole vision of the project: this one and the water management one. The opportunity to propose this vision has leaded us to choose this project as a case study.

This case study is related with the water key-problem “Management and conception of urban water infrastructures”.

Sector	Waste	Energy	Water	Transport	Green/blue	Building & Land Use
			X			

Scale of project	Component	Building	Neighbourhood	City	Region
			X		

Status of project	Starting up	Ongoing	Finished	Start date	End date
		X		1998	Around 2030

Key words **Evaluation Grid, Urban renewal, city center context, water network**	
Project a. Object (building, city park, wind farm, etc.) b. Type of activity (regeneration, renovation, new development, etc.) c. Type of product (plan, scheme, design project, etc.)	a. Object: Sewer and storm water network b. Type of activity: renovation c. Type of product: design project
Tool a. Character (according to WP3final0704.doc) b. Benchmarks (qualitative or quantitative) c. Availability (paid/ free)	a. Character: grid / matrix b. Benchmarks: yes (quantitative) c. Availability: free
Decision-making process a. Stage of the tool implementation (preliminary,	

midterm, etc.) b. Level (political, technical, etc.) c. Public participation	a. Stage of the tool implementation: preliminary b. Level: Technical c. Public participation: no
Other *(optional, if needed)*	

DETAILED INFORMATION

A. Detailed description of project and tool

1. Description of context

This case study is strongly embedded in a context characterised by political forces. Indeed the project Lyon-confluence is one of the biggest since several years in Lyon, whose influence is national. The impacts on Lyon vitality and way of life for the Greater Lyon's inhabitants are significant. And that's why it represents a great challenge that the city should overcome.

2. Description of project

"Lyon Confluence" is one of Greater Lyon's biggest projects. It is a long-term project, planned until 2030 which consists on the renewal of an old industrial area into a downtown district.
Located between two rivers, Rhone and Saone (see figures 1 & 2), and long restricted to industry and transport facilities, the peninsula is undergoing a transformation, a complete and extensive change.
This strategic territory is now being prepared for the function it should have had due to its central and pivotal location at the south of Perrache railway station (see figure 1): a true city-centre.

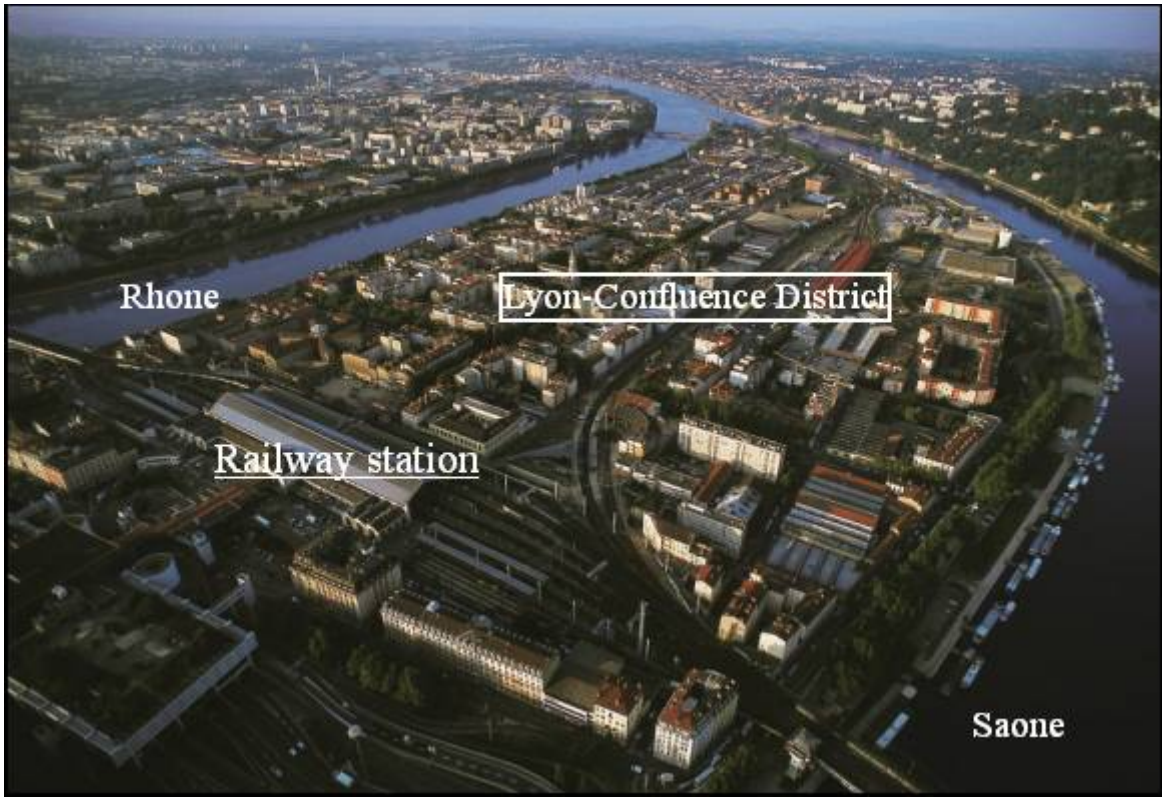

Fig1: Presentation of the project site (source: "Lyon-Confluence" developer association)

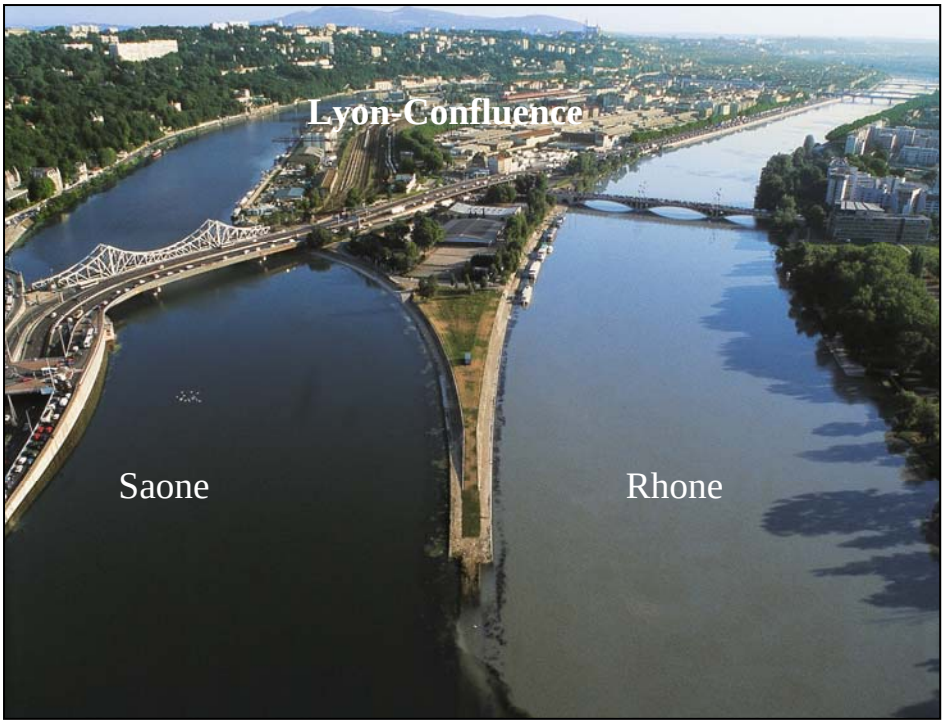

Figure 2: Lyon-confluence limits defined by 2 rivers (source: "Lyon-Confluence" developer association)

The site of Lyon Confluence, an essential core transport junction, spreads over 150 ha, including currently 30-40 ha for urban residential areas (7000 inhabitants), 70 ha for industrial infrastructures and 5 km of river sides. It is planned that around 2030, 25 000 inhabitants should live in the project area, 14000 employments should be created by the coming of new leisure and cultural infrastructures and a wide place of green space should be reserved (30-40 ha).

As far as water management is concerned, a preliminary study was done in several steps:

- inventory and diagnosis of existing networks,
- definition of objectives,
- definition of means,
- decisions on orientations.

The zone is at present time essentially industrial with brown fields, and presents a combined sewerage system, sometimes in poor condition.

The diagnosis has underlined 3 points:

- maintenance difficulties due to pipes silting or too small infrastructures (access difficulty),
- existence of nuisances and troubles for river side residents (rats, odour pollution, flooding…),
- pollution of the receiving bodies during storm weather due to overflow devices,

The solution adopted is to build separate sewer system only in new zones (where a complete sewer network reconstruction is necessary), taking into account the immediate proximity of a superficial receiving water body, which has a low sensibility (Saone and Rhone). In that way, waste water can be carried out to the urban waste water treatment plant for its cleaning up and storm water is directly sent into the receiving water body. The advantage of this solution is the reduction of the water amount that the

waste water treatment plant has to clean which often enhances its efficiency.
The choice to separate the whole network of Lyon Confluence neighbourhood would be very expensive. The operation and maintenance costs would be also expensive and there would be a risk of not reaching 100% of the objectives (see section A3- definition of objectives). That's why the compromise which has been chosen is to build a separate sewer network in new zones only.

This solution is also completed by the will to treat the storm water as close to the source as possible and to discharge it in the Saone or Rhone. Simple solutions have to be found to resolve flooding problems, but they have to be compatible with future developments. It is the use of swales[1] for example. The consideration of storm water infiltration conditions at the planning stage of urbanisation makes its implementation easier. Several future green spaces could be used for the storm water management.

The objective of integrating storm water in cityscape needs the development of simple solutions easy-to-understand for citizens which can encourage them to have responsible behaviour (no damage to amenities etc).

The objective of reducing investment and operation costs for sewer and storm water infrastructures (see section A3- definition of objectives) results in implementing new water pipes with at least a minimal slope of 3mm/m in order to limit the silting up of the network. It results also in the use of a gravity network which does not need pumping station to work suitably: it improves the maintenance conditions and reduces the cost.

3. Description of tool

The project is starting up. An approach was conceived and applied by the water direction of Greater Lyon. It is based on recommendations of the city's water management new guide[2]. It follows different steps:

1/ Diagnosis of the sewage system.
2/ Definition of objectives:
(i) increase natural environment quality,
(ii) reduce risk of flooding,
(iii) decrease investment and operation costs,
(iv) integrate storm water in cityscape.
3/ Definition of means:
- For the city: (i) decrease pollutants from the source (it concerns used construction material and other practices like water consumption, fuel use etc. An HQE[3] charter could allow it),
(ii) plan the flooding management (design of sewer network and infrastructures that directs exceptional flows -due to wet weather- to receiving bodies or green spaces without human or material damages),
(iii) treat storm water or use it.
- For the drainage system:
(i) disconnect storm water from the rest of the combined sewer system,

[1] Swale: it is a grassed earth channel used to intercept surface runoff draining from impervious surfaces and directing the intercepted water to streams or other drainage structures such as infiltration trenches or wetlands. Swales are designed to provide a level of flow retardation as well as to act as filter systems in respect to biofiltration of suspended particles and associated pollutants.

[2] LA VILLE ET SON ASSAINISSEMENT principes, méthodes et outils pour une meilleure intégration dans le cycle de l'eau - éditions du certu. 2003

[3] High Environmental Quality (Haute Qualité Environnementale)

(ii) limit combined sewer overflows,
(iii) limit infiltration / exfiltration on network.

4/ Choice of sustainable orientations of the project:
(i) separate sewer system in new zones,
(ii) find simple solutions for zones liable to flooding,
(iii) adopt HQE^3 charter,
(iv) treat storm water.

5/ Comparison of a range of solutions for the sewer system rehabilitation and requalification.

⇨ A grid was developed by the design section of the water department of the Greater Lyon to compare 13 imagined solutions, on a sustainable development criteria base. This multicriteria grid enables to mark to the different solutions, and the "best" solution is the one with the highest mark. The assessed criteria are: social, environmental, economical and governance:

- Limitation of nuisance (noise, odours) and intervention frequency
- Reduction of work hardness,
- Protection against flooding,
- Limitation of natural resources consumption (water, energy),
- Limitation of impacts on natural environment,
- Limitation of waste production,
- Limitation of investment cost,
- Limitations of operation cost,
- Possibility for the solution to be modified as the project advances,
- Clearness of the presentation of the project - understandable by non-scientific public,
- Integration of works in the city, adaptation to future uses,
- Integration of the water cycle in urban planning.

For each solution, a mark is given for each criterion:

- 1 if the criterion is taken into account in the solution,
- -1 if the criterion is not taken into account in the solution,
- 0 if there is no incidence.

The solution which obtains the best total mark is supposed to best respond to sustainable development criteria.

B. Tool implementation

1. Argumentation for choosing the tool

There is a wish, from the Water Direction of Greater Lyon, to integrate the sustainable development dimensions into the approach.
This approach was presented to the elected representatives, who approved it.

The multicriteria grid presented above is similar to grids presented in other case studies. Its goal is to help choosing a solution and provide argumentation.
The solutions follow a logical arguing, and respond to sustainable development objectives.

2. Barriers for the tool implementation

- Time and human resources needed (at least, one person to create the grid, and one other to use the grid

for the evaluation, both being different from the design engineer) to implement the evaluation grid can be important.

- In order to use the grid in the most effective way, to evaluate different solutions with an objective view, it should not be the same person that hold on the project, create the grid and use the grid to evaluate different alternatives in regard with sustainability. Here it is not the case; the project engineer has designed the project, created the evaluation grid and used it to evaluate the project alternatives. Therefore the evaluation process was not really objective.
That's why the grid has presented very few impact on the decision making process. The project engineer has chosen to not present the grid to the electives representatives because of the lack of objectivity of its use, even if they could have been interested in such grid.

C. Influence of the tool on the decision-making process

1. Description of the decision-making process/procedures

As it is mentioned above, the use of the evaluation grid had not an impact on the decision making process. It has however helped the project engineer to choose between the 13 solutions in regard with the criteria that were defined (internal use). But it has not been used to support decisions and argumentations of the final project for the presentation to the elected representatives because of the lack of objectivity.

The grid had just a role between technicians and project engineer, without being an 'official' tool, means a tool used to support an argumentation in regard with the decision-making process. It has raised the issue of implementing a sustainable evaluation.

2. Tool in decision-making process

See previous section.

3. Transparency of decision-making process

D. Expert assessment/analysis/comment of the tool effectiveness

1. Assessment by tool users

The grid will probably be used to evaluate network solutions that will be proposed in the new mixed development zone, when studies on the project will be open.

As it is mentioned above, the use of such grid is time-consuming and needs to involve several people in the evaluation process.

Even if the grid had no impact on the decision making process, its elaboration was a first step to implement an evaluation procedure. The project engineer hopes that the grid will be used through another project. It was a first learning step.

2. Reviewer's assessment

There is a need for improving the multicriteria evaluation grid. The given marks are quite subjective. Furthermore, this evaluation mode is additive and compensatory.

This project of sewer network rehabilitation is a part of the whole neighbourhood renewal (see case study "Lyon Confluence major urban development "). The water management has raised an interesting issue in regard with sustainability. This is the opportunity to make different technical services working together at the design stage. For example, the objective of decreasing pollution from the source implies avoiding using materials liable to generate toxics. Also, the flooding management implies a new conception of public spaces.
There is also a wish to decompartimentalise technical services for the infrastructures management. A dialogue between the Water Direction of Greater Lyon and the developer contractor (Lyon Confluence) was opened to think about optimising street cleaning in order to reduce the production of pollutants by rainy weather: use of a vacuum / high pressure roadsweeper, communication and signposting work, concerning specially waste collection in leisure places to prevent solid waste to settle in the receiving water via the sewer network.

E. Additional information on the case study available	
Websites	http://www.grandlyon.org
References *concerning the case but also the key words or problem* (papers, articles, reports, laws, etc.)	- LA VILLE ET SON ASSAINISSEMENT principes, méthodes et outils pour une meilleure intégration dans le cycle de l'eau - éditions du certu. 2003 - Ellis B, Chocat B, Fujita S, Rauch W, Marsaleck J. Urban Drainage : A multilingual glossary. IWA publishing. 2004. 512p.
Other sources (Interviews, conferences, discussions, etc.)	
Contact details for further information	For further information, please contact: Elisabeth Sibeud Head of the design section of the water department of the Greater Lyon Email : esibeud@grandlyon.org