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# **TMP-CH: Traffic Management Plans, a pilot study for western Switzerland**

**André Robert-Grandpierre, RGR SA**  
**Jeff Konnen, INSER SA**

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## **TMP-CH: Traffic Management Plans, a pilot study for western Switzerland**

André Robert-Grandpierre  
RGR SA  
Lausanne

Phone: 021-616 10 78  
Fax: 021-616 36 88  
e-Mail: andre@rgr-sa.ch

Jeff Konnen  
INSER SA  
Le Mont-sur-Lausanne

Phone: 021-643 77 11  
Fax: 021-643 77 10  
e-Mail: jk@inser.ch

## **Abstract**

In Switzerland, traffic is regulated at the cantonal level. For special situations however decisions have to be made at an inter-cantonal level and bilateral agreements are made between the different police corps.

TMP-CH aims at structuring these collaborations in order to permit rational event management by defining several traffic management plans. Thus, traffic management plans for the major highways in western Switzerland have been defined, including traveller information. Coordination of radio broadcasted messages and VMS (Variable Message Signs) Information was also part of the study.

These Plans were tested during the Swiss National Exposition 02 and will be the basics for the establishment of Swiss-wide Traffic Management Plans.

## **Keywords**

Traffic Management Plan– Traveller Information – VMS – 3<sup>rd</sup> Swiss Transport Research Conference – STRC 2003 – Monte Verità

## 1. Introduction

Nowadays, traffic is regulated at the cantonal level in Switzerland,. For special situations however decisions have to be made at an intercantonal level and bilateral agreements are made between the different police corps.

With the recent opening of the A1 between Yverdon and Payerne, on VD and FR territory, and the oncoming A5 on VD and NE territory, the needs for an inter-cantonal decision platform have increased.

The objective of the TMP-CH study is to introduce an experimental operating centre to manage inter-cantonal traffic events. Thus, the following functions had to be assured during the test phase:

- Knowledge of traffic conditions
- Monitoring of highway events
- Analysis of highway events (duration, traffic charge)
- Introduction, management and suppression of a Traffic Management Plan (TMP)

The TMP-CH study is subdivided into several phases:

- Analysis of the actual situation, establishment of TMPs and action plans. This phase is described in the present article
- Definition of traffic prediction models (POLYDROM from C. deRham +DYNAMIT, realised by EPFL-scientists)
- Implementation and management of the experimental operating centre
- Evaluation of the results and recommendations for future steps

As this study was partly intended for traffic management at the Swiss national exposition, two planning states have been considered:

- Swiss national Exposition in 2002
- Long-term planning for 2020, when the western highway network will be achieved.

## 2. Description of the TMPs

A traffic management plan is a set of rules for long distance traffic management. For each TMP, several possible scenarios are defined, depending on the event's duration and the state of the highway network. The choice of a scenario depends on the type of actions to be taken. At a first stage, a set of possible deviations for the studied highway network has been defined with travel time and distance as criteria. For each possible perturbation of the network, a traffic management plan (TMP) is defined. According to the duration and the gravity of the incident, different scenarios relying on the deviation catalogue and traveller information strategies are defined. This is done according to the following tables (Tables 1 and 2).

Table 1 Affection of scenarios according to the traffic situation

	Predicted incident duration					
	Up to 30 min		30 min – N h <sup>1</sup>		More than N h	
	Reduced capacity	Highway closed	Reduced capacity	Highway closed	Reduced capacity	Highway closed
Capacity						
Scenario	a	a	a/b	c	a/d	e

Table 2 Actions to be taken for a particular scenario type

Actions	SCENARIOS				
	a	b	c	d	e
Information	X	X	X	X	X
Major deviations		X	X	X	X
Local deviations			X		X
Bi-directional traffic				X	
Complementary actions					X

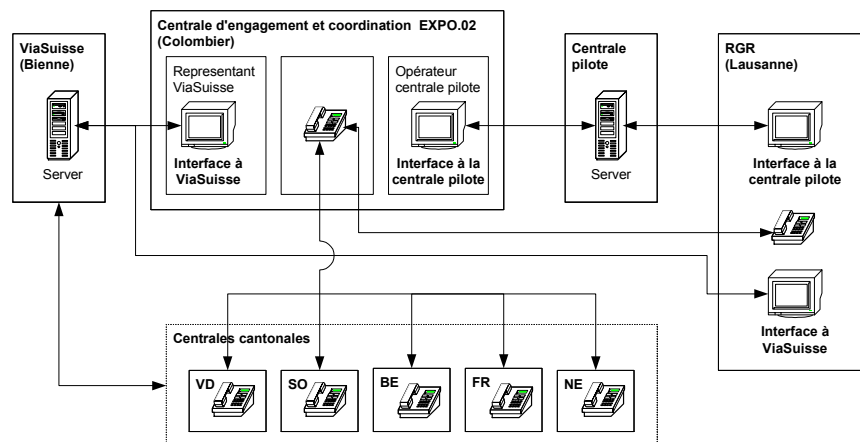
<sup>1</sup> Segments with regulation for bi-directional traffic: N=2h  
 Segments without regulation for bi-directional traffic: N=4h

### 3. Architecture of the Expo.02 TMP-Headquarter

During Expo.02, a temporary TMP-Headquarter was created in Colombier to manage the traffic caused by the manifestation. It regrouped representatives of each canton and of ViaSuisse. Decisions were coordinated among the different parties on site.

Input was, among others, given by the traffic counters of ASTRA, the Swiss federal roads authority, and the ViaSuisse information system, TIC by GEWI. The computations were done by the TMP-Information System (which was assured during office hours at RGR in Lausanne) and the measures were communicated by telephone or fax to the cantonal authorities and the Expo.02 central.

Figure 1 Infrastructure of the TMP-CH Headquarter





## 4. The Information System

The different rules defined by the traffic management plans have been implemented into a state-of-the-art information system.

Its conception was based on an object-oriented UML modelling of the user needs. In the following chapter, some example screenshots illustrating the functioning of the IS are shown.

Figure 3 Physical architecture of the Information System

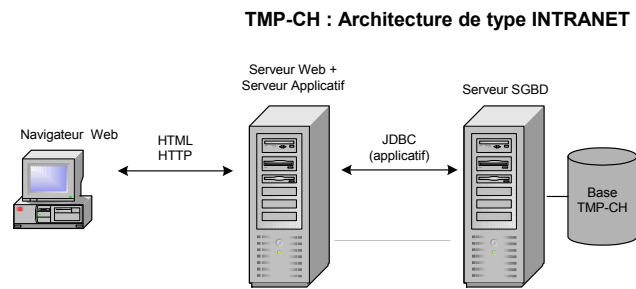
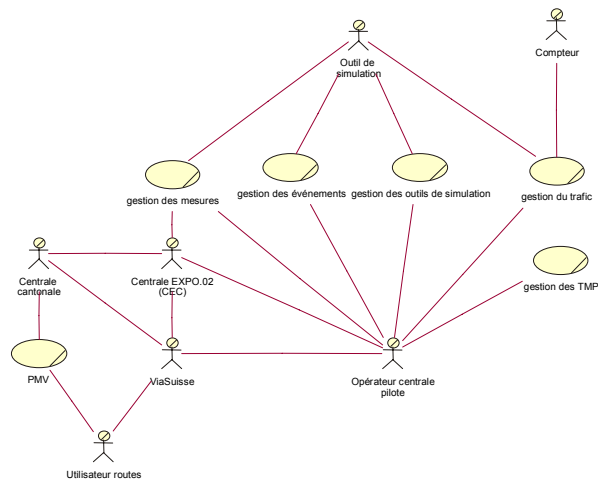


Figure 4 UML Business Use Case Diagram of the Information System



## 5. TMP Examples

To illustrate the functioning of the TMP concept, 2 example events will be shown.

### 1) A traffic congestion on A1 between Yverdon and Payerne

Let's imagine, there is an accident on the A1 between Yverdon and Payerne. One highway lane is closed temporarily, causing traffic congestion. The TMP operator enters the event into his information system (see Figure 5). After a little rule-based reasoning, the system proposes TMP n° 3, scenario 3a. This means that the drivers should be informed of the congestion, without need for a deviation to be proposed. The system finally generates a standard fax (see Figure 6), containing the text to be shown on a particular VMS. This fax can then be transmitted to the police office in charge.

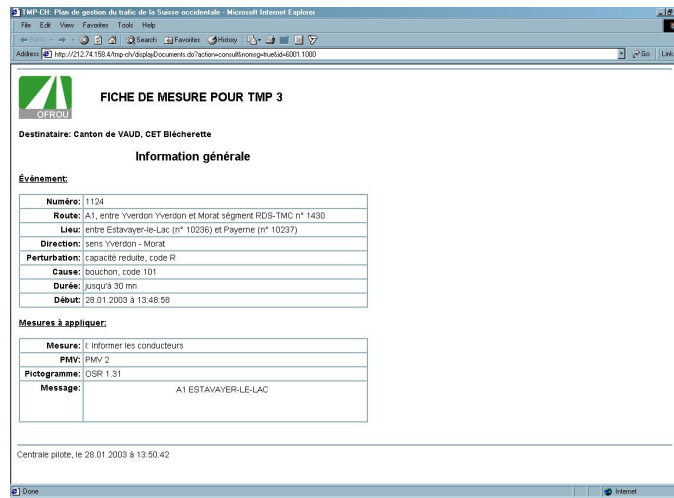
Figure 5 The proposition of the TMP-Information System for a traffic congestion on A1

The screenshot shows a web-based interface for the TMP-Information System. The browser title is "TMP-CHI: Plan de gestion du trafic de la Suisse occidentale - Microsoft Internet Explorer". The page has a navigation menu on the left with options: ACCUEIL, Événements, MESURES, and QUITTER. The main content area is titled "Détails Scénario - Confirmation" and contains the following fields:

- Number: 1124
- Route: A1 Tronçon TMP: Yverdon - Payerne
- Location: Estivay-le-Lac / Payerne
- Direction: +, -, z
- Type: Evolution
- Duration: jusqu'à 30 min
- Capacity: module, AR fermé

At the bottom of the form, there are two red circles highlighting the "TMP n° 3" and "Scénario: 3a" fields, and another red circle highlighting the "Mesure" and "Remarque" fields. The "Mesure" field contains the text "Informez les conducteurs". At the bottom of the page, there are buttons for "Confirmer" and "Compter événement", and the logos for "INSER" and "viasuisse".

Figure 6 Fax generated for scenario 3a



2) A highway closure due to an accident on A12 between Châtel-St Denis and Vaulruz

In our second example, we imagine a highway closure on A12, between Châtel-St Denis and Vaulruz. The TMP information system proposes TMP n° 31, scenario 31c (see Figure 7). This means driver information, implementation of a large-scale deviation (n°11) as well as a local deviation. The system generates a fax for each action (see Figure 8), which can be transmitted to the different authorities in charge. Finally, the implementation may be confirmed to the system.

Figure 7 The proposition of the TMP-Information System for a highway closure on A12

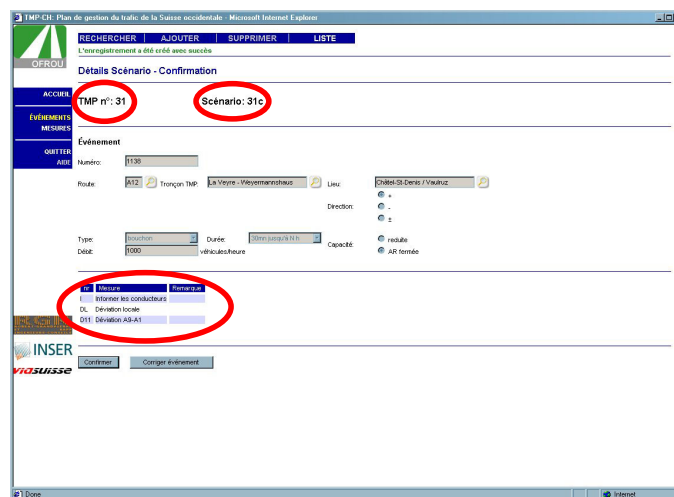


Figure 8 Faxes generated for scenario 31c

IMP-CH: Plan de gestion du trafic de la Suisse occidentale - Microsoft Internet Explorer

http://121.74.158.4/imp-ch/isp/Document.do?action=consultation&eventId=4001.1003

**FICHE DE MESURE POUR TMP 31**

Destinataire: Canton de VAUD, CET Biecherette

**Information générale**

**Évènement:**

<b>Numéro:</b>	1138
<b>Route:</b>	A12, entre Vevey-Vevey et Fribourg segment RDS-TMC n° 1407
<b>Lieu:</b>	entre Châtel-St-Denis (n° 10307) et Vaulruz (n° 10836)
<b>Direction:</b>	sens Vevey - Fribourg
<b>Perturbation:</b>	autoroute fermée, code F
<b>Cause:</b>	bouchon, code 101
<b>Durée:</b>	30mn jusqu'à N h
<b>Début:</b>	28.01.2003 à 14.57.13

**Mesures à appliquer:**

<b>Mesure:</b>	Informier les conducteurs
<b>PMV:</b>	PMV 1
<b>Pictogramme:</b>	OSR 1.31
<b>Message:</b>	A12 CHÂTEL-ST-DENIS

<b>Mesure:</b>	Informier les conducteurs
<b>PMV:</b>	PMV 4
<b>Pictogramme:</b>	OSR 1.31
<b>Message:</b>	A12 CHÂTEL-ST-DENIS

IMP-CH: Plan de gestion du trafic de la Suisse occidentale - Microsoft Internet Explorer

http://121.74.158.4/imp-ch/isp/Document.do?action=consultation&eventId=4001.1003

**FICHE DE MESURE POUR TMP 31**

Destinataire: Canton de VAUD, CET Biecherette

**Scénario 31c**

**Évènement:**

<b>Numéro:</b>	1138
<b>Route:</b>	A12, entre Vevey-Vevey et Fribourg segment RDS-TMC n° 1407
<b>Lieu:</b>	entre Châtel-St-Denis (n° 10307) et Vaulruz (n° 10836)
<b>Direction:</b>	sens Vevey - Fribourg
<b>Perturbation:</b>	autoroute fermée, code F
<b>Cause:</b>	bouchon, code 101
<b>Durée:</b>	30mn jusqu'à N h
<b>Début:</b>	28.01.2003 à 14.57.13

**Mesures à appliquer:**

<b>Mesure:</b>	D11: Déviation AS-A1
<b>PMV:</b>	PMV 6
<b>Pictogramme:</b>	OSR 4.02
<b>Message:</b>	A12 CHÂTEL-ST-DENIS BERN VIA LAUSANNE A9-A1

Centrale pilote, le 28.01.2003 à 14.58.26

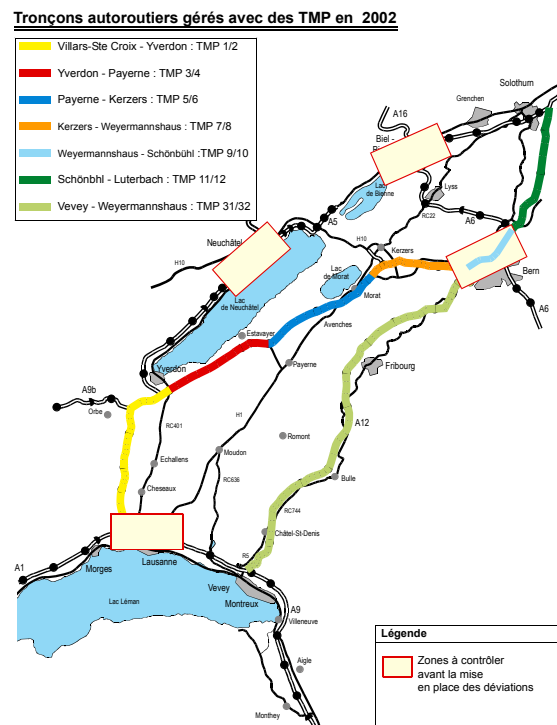
## 6. Outlook

The TMPs which are currently defined are based on the Swiss highway network over the planned test area in 2020 (see Figure 9). Nevertheless, it is planned to extend the TMP concept to the entire Swiss highway network.

As a first step, the actual application is installed at the ViaSuisse traffic information central in Bienne. If these tests turn out to be positive, the concept and the system may be extended over the next years.

The first tests at Expo.02 have shown that TMP-CH can be a very useful application for managing traffic at a large scale. It could help to coordinate the actions between the several partners in traffic management and improve the decision making process.

Figure 9 Highway sectors managed by TMP in 2002

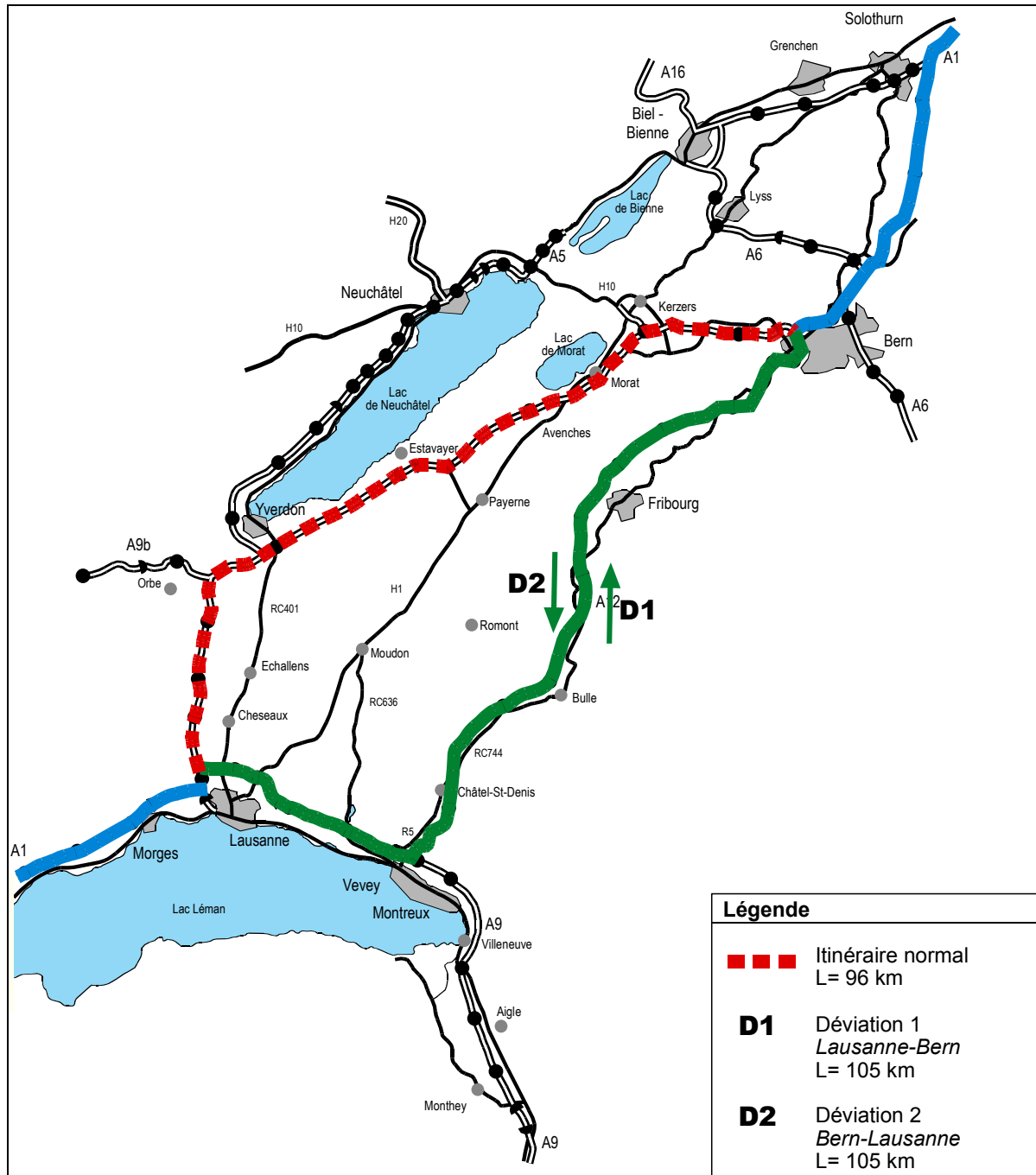


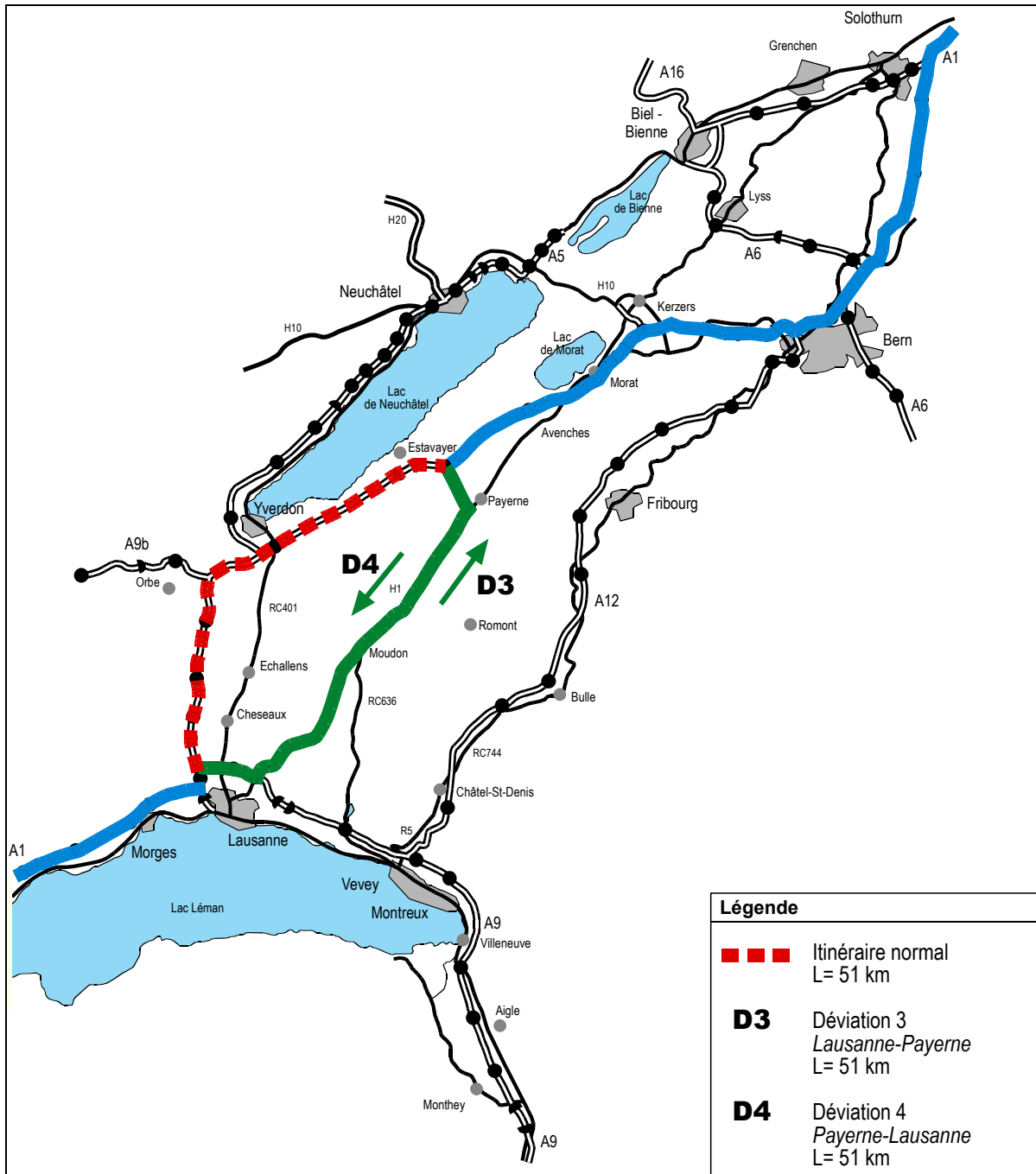
## **7. References**

INSER SA, (2002) TMP-CH, Analyse préliminaire

Robert-Grandpierre, André (2001) TMP-CH, Centrale pilote, Analyse de la situation actuelle et établissement des TMP.

## Appendix A: Deviations: 2 Examples





## Appendix B: TMP, example:

### TMP n° 1 - Etat 2002

Autoroute : A1	Direction : +
Tronçon : Villars - Ste-Croix / Yverdon	

Segment :	
Longueur :	Caractéristiques :

Scénarios						
	Durée prévisible de l'incident					
	Jusqu'à 30mn		30mn jusqu'à N h (1)		Plus de N h (1)	
Capacité	Capacité réduite	AR fermée	Capacité réduite	AR fermée	Capacité réduite	AR fermée
Scénario	1a	1a	1a / 1b	1c	1a / 1d	1e

Mesures			
Scénarios	Mesures		Page
1a	I	Informers les conducteurs	
1b	I	Informers les conducteurs	
	D1	Déviations A9-A12 (véhicules légers)	
	D3	Déviations A9-H1 (poids lourds)	
1c	I	Informers les conducteurs	
	DL	Déviations locales	
	D1	Déviations A 9- A 12 (véhicules légers)	
	D3	Déviations A 9- H 1 (poids lourds)	

Scénarios	Mesures		Page
1d	I	Informer les conducteurs	
	D1	Déviation A9-A12 (véhicules légers)	
	D3	Déviation A9-H1 (poids lourds)	
	TMP 2	Mise en place du scénario 2d en cas de trafic bidirectionnel	
1e		Scénario 1c avec mesures complémentaires en fonction de la situation effective, y compris aux niveaux interrégional et international	

Remarques	
Mesures	Aspects particuliers
I	Information via Radio (Inforoute, RDS-TMC), internet et PMV
DL	Déviation locale mise en place par la Police
D1	Vérification de la faisabilité de la déviation (disponibilité, compatibilité des flux de trafic)
D3	Vérification de la faisabilité de la déviation (disponibilité, compatibilité des flux de trafic)

**Durée prévisible de l'incident :**

(1) Cette durée est fonction de la mise en place du trafic bidirectionnel:

- Segments avec régulation: N = 2 heures
- Segments sans régulation: N = 4 heures

**Capacité :**

Capacité réduite : Fermeture partielle de l'autoroute  
 AR fermée : Fermeture complète de l'autoroute