CiViTAS
Cleaner and better transport in cities

ARCHIMEDES
AALBORG • BRIGHTON & HOVE • DONOSTIA - SAN SEBASTIÁN • IAŞI • MONZA • ÚSTÍ NAD LABEM

Monza

T11.11 – Monza Sustainable Urban Transport Plan - Summary

City of Monza

January 2012

THE CIVITAS INITIATIVE
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Contents

1. Introduction

1.1 Background CIVITAS

CIVITAS - cleaner and better transport in cities - stands for CIty-VITAlity-Sustainability. With the CIVITAS Initiative, the EC aims to generate a decisive breakthrough by supporting and evaluating the implementation of ambitious integrated sustainable urban transport strategies that should make a real difference for the welfare of European citizens.

CIVITAS I started in early 2002 (within the 5th Framework Research Programme);
CIVITAS II started in early 2005 (within the 6th Framework Research Programme) and
CIVITAS PLUS started in late 2008 (within the 7th Framework Research Programme).

The objective of CIVITAS-Plus is to test and increase the understanding of the frameworks, processes and packaging required to successfully introduce bold, integrated and innovative strategies for clean and sustainable urban transport that address concerns related to energy-efficiency, transport policy and road safety, alternative fuels and the environment.

Within CIVITAS I (2002-2006) there were 19 cities clustered in 4 demonstration projects, within CIVITAS II (2005-2009) 17 cities in 4 demonstration projects, whilst within CIVITAS PLUS (2008-2012) 25 cities in 5 demonstration projects are taking part. These demonstration cities all over Europe are funded by the European Commission.

Objectives:

- to promote and implement sustainable, clean and (energy) efficient urban transport measures
- to implement integrated packages of technology and policy measures in the field of energy and transport in 8 categories of measures
- to build up critical mass and markets for innovation

Horizontal projects support the CIVITAS demonstration projects & cities by :

- Cross-site evaluation and Europe wide dissemination in co-operation with the demonstration projects
- The organisation of the annual meeting of CIVITAS Forum members
- Providing the Secretariat for the Political Advisory Committee (PAC)
- Development of policy recommendations for a long-term multiplier effect of CIVITAS

Key elements of CIVITAS

- CIVITAS is co-ordinated by cities: it is a programme “of cities for cities”
- Cities are in the heart of local public private partnerships
- Political commitment is a basic requirement
- Cities are living ‘Laboratories' for learning and evaluating

1.2 Background ARCHIMEDES

ARCHIMEDES is an integrating project, bringing together 6 European cities to address problems and opportunities for creating environmentally sustainable, safe and energy efficient transport systems in medium sized urban areas.

The objective of ARCHIMEDES is to introduce innovative, integrated and ambitious strategies for clean, energy-efficient, sustainable urban transport to achieve significant impacts in the policy fields of energy, transport, and environmental sustainability. An ambitious blend of policy tools and measures will increase energy-efficiency in transport, provide safer and more convenient travel for all, using a higher share of clean engine technology and fuels, resulting in an enhanced urban environment (including reduced noise and air pollution). Visible and measurable impacts will result from significantly sized measures in specific innovation areas. Demonstrations of innovative transport technologies, policy measures and partnership working, combined with targeted research, will verify the best frameworks, processes and packaging required to successfully transfer the strategies to other cities.

1.3 Participant Cities

The ARCHIMEDES project focuses on activities in specific innovation areas of each city, known as the ARCHIMEDES corridor or zone (depending on shape and geography). These innovation areas extend to the peri-urban fringe and the administrative boundaries of regional authorities and neighbouring administrations.

The two Learning cities, to which experience and best-practice will be transferred, are Monza (Italy) and Ústí nad Labem (Czech Republic). The strategy for the project is to ensure that the tools and measures developed have the widest application throughout Europe, tested via the Learning Cities' activities and interaction with the Lead City partners.

1.3.1 Leading City Innovation Areas

The four Leading cities in the ARCHIMEDES project are:

- Aalborg (Denmark);
- Brighton & Hove (UK);
- Donostia-San Sebastián (Spain); and
- Iasi (Romania).

Together the Lead Cities in ARCHIMEDES cover different geographic parts of Europe. They have the full support of the relevant political representatives for the project, and are well able to implement the innovative range of demonstration activities.

The Lead Cities are joined in their local projects by a small number of key partners that show a high level of commitment to the project objectives of energy-efficient urban transportation. In all cases the public transport company features as a partner in the proposed project.

2. Monza

Monza is a city on the river Lambro, a tributary of the Po, in the Lombardy region of Italy, some 15km north-northeast of Milan. It is the third-largest city of Lombardy and the most important economic, industrial and administrative centre of the Brianza area, supporting textile industry and publishing trade. It is best known for its Grand Prix.

The City of Monza, with approximately 121,000 inhabitants, is located 15 km north of Milan, which is the centre of the Lombardia area. This area is one of the engines of the Italian economy; the number of companies is 58,500, i.e. a company for every 13 inhabitants.

Monza is affected by a huge amount of traffic that crosses the city to reach Milan and the highways nodes located between Monza and Milan. It is also an important node in the Railways network, crossed by routes connecting Milan with Como and Switzerland, Lecco and Sondrio, Bergamo and Brianza. "Regione Lombardia", which in the new devolution framework started in 1998, has full responsibility for establishing the Local Public Transportation System (trains, coaches and buses) and has created a new approach for urban rail routes using an approach similar to the German S-Line or Paris RER.

Monza has recently become the head of the new "Monza and Brianza" province, with approximately 750,000 inhabitants, so will gain the full range of administration functions by 2009. Plan-making responsibilities and an influence over peri-urban areas will require the city to develop new competencies.

In this context, the objective of the City of Monza in participating in CIVITAS as a Learning City is to set up an Urban Mobility System where the impact of private traffic can be reduced, creating a new mobility offer, where alternative modes become increasingly significant, leading to improvements to the urban environment and a reduction in energy consumption (and concurrent pollution).

3. Background to the Deliverable

Task 11.8.8 of the ARCHIMEDES project concerns the development of a Sustainable Urban Transport Plan (SUTP) for Monza.

A significant effort has been placed into the production of a full SUTP. This deliverable is presented as an English language summary of the SUTP – anyone interested in the full SUTP, which is written in Italian should contact the Monza mobility Department.

3.1 Summary Description of the Task

As one of the two ARCHIMEDES cities designated as ‘learning cities’ the City of Monza was put forward as needing to develop a Sustainable Urban Transport Plan.

This was not straightforward because in Italy, there are firm regulations on the subject which guide Municipalities (such as Monza) in their approach to SUTP. In Italy, the PUM, a strategic medium-long term plan (compulsory for cities of over 100,000 inhabitants), is backed by a shorter, 2 year term, the PUT (which becomes compulsory for cities over 30,000). A Master Plan regulates transport planning at the regional level. In Italy, three Planning Levels for a city like Monza are expected:

1-Overall Territory Planning, through the General Territory Plan-PGT, which defines the development of the city in medium-terms (approx five years);
2- The Urban Mobility Plan-PUM (compulsory for cities of over 100,000 inhabitants), which proposes strategic decisions concerning Mobility Management suited for the evolution of the city depicted by the PGT;
3-The Urban Traffic Plan-PUT (which is compulsory for cities over 30,000 inhabitants) to provide actual decisions for the current Mobility situation (Parking policies, One-Way implementation for primary roads, creation or suppression of Traffic Light systems for primary road network, Creation of Reserved Bus Lanes…).

SUTP does not simply mean developing a transport "master plan", embracing all the plans and programmes that local authorities are formally required to prepare. It is also not finished once a plan containing innovative transport measures has been adopted. Rather, SUTP represents the direction in which current planning practices should be moving continuously in order to enhance sustainable urban transport development.

4. Sustainable Urban Transport Plan in Monza

4.1 Aims and Prefixed Objectives

The Sustainable Transport Plan for the City of Monza has the following aims:

- offer to all people accessibility to public transport;
- reduce negative impact of traffic to people health and safety;
- reduce noise, atmospheric pollution and energy consumption;
- improve efficiency of transport system;
- improve quality of the environment and of the urban planning.

The Sustainable Transport Plan for the City of Monza is proposed as an Objective-driven Plan.

The following objectives are assumed as reference for the Plan:

- Air Pollution
  - CO_2: 10% reduction in the short term (2-3 years)
  - CO_2: 20% by 2021 (15% reduction due to vehicle improvements)
  - CO_2: 30% by 2031 (30% reduction due to vehicle improvements)

- Energy Consumption
  - CO_2: 10% reduction in the short term (2-3 years)
  - CO_2: 20% by 2021 (15% reduction due to vehicle improvements)
  - CO_2: 30% by 2031 (30% reduction due to vehicle improvements)

- Noise
  - 5 dB(A) reduction (class change)

Noise Limits [LAeq in dB(A)]

LAND USE CLASS	DAY (6.00-22.00)	NIGHT (22.00-6.00)
I HIGH PROTECTION	50	40
II MAINLY RESIDENTIAL	55	45
III MIXED ACTIVITIES	60	50
IV INTENSE HUMAN ACTIVITIES	65	55
V MAINLY INDUSTRIAL	70	60
VI ONLY INDUSTRIAL	70	70

- Traffic Levels
  - 5% reduction in the short term (2-3 years)
  - 15% by 2021 (with 6.7% increase in travel demand)
  - 15% by 2031 (with 26.1% increase in travel demand)

- Congestion
  - 10% reduction in the short term (2-3 years)
  - 20% reduction by 2021
  - 20% reduction by 2031

- Road Accidents (no. of victims)
  - 20% reduction in the short term (2-3 years)
  - 50% reduction by 2021

- Public transport

Significant increase in modal share in order to satisfy most of the travel demand transferred from private vehicles

- Cycling

Significant increase in modal share

- Electric Car Sharing

Significant increase in modal share

- Car Pooling

Significant increase in modal share

4.2 Study Approach

The study has been developed according the following logical main steps:

- analysis of the existing situation;
- identification of the Plan scenario;
- objectives and monitoring indicators;
- action and economic plan;
- responsibilities and resources;
- monitoring and results evaluation.

The European Guidelines suggest to develop the Plan within an overall long term strategy (20-30 years) and to monitor the results every 1-2 years.

Appropriate indicators are used for the problems diagnosis and for the quantification of the objectives.

The study follows an iterative process in order to finalise the Plan scenarios to the proposed objectives (Figure 2.1).

The Plan scenarios concern the whole mobility system of Monza with synergic actions on urban planning, infrastructures planning and transport and traffic management.

Strategic transport models, traffic and public transport models, air pollution models (COPERT IV) have been used for the development of the Plan.

The detailed knowledge of Monza travel demand, elaborated from an extensive household survey enabled the development of the SUTP starting with the identification of the potential travel demand which, for the characteristics of the trip and of the traveller, may be transferred from private car to more sustainable transport modes.

In co-operation with Monza Municipality Urban Planning Department the travel demand scenarios at the present time and in 10 years and 20 years' time have been defined.

For each reference year the segments of travel demand which may be transferred from private car to more sustainable transport modes have been estimated.

In particular the following segments have been evaluated:

- the segment of travel demand which may be directly transferred to public transport;
- the segment of travel demand which may be transferred to park and ride;
- the segment of travel demand which may be transferred to bike including bike sharing;
- the segment of travel demand which may be transferred to walking;
- the segment of travel demand which may be transferred to electric car sharing;
- the segment of travel demand which may be transferred to car pooling;
- the through traffic which may be diverted from the City Centre to external roads.

For the present travel demand scenario the existing transport infrastructures have been considered.

For the 10 years and 20 years travel demand scenarios the future transport infrastructures justified by the potential travel demand have been considered, in particular:

- the new road network in particular the Ring Road;
- the development of an innovative public transport system;
- the complete cycle network.

For each scenario the normative actions necessary to transfer travel demand to other transport modes have been identified. In particular they include:

- traffic control;
- parking charge;
- road pricing;

- public transport and alternative transport modes fares.

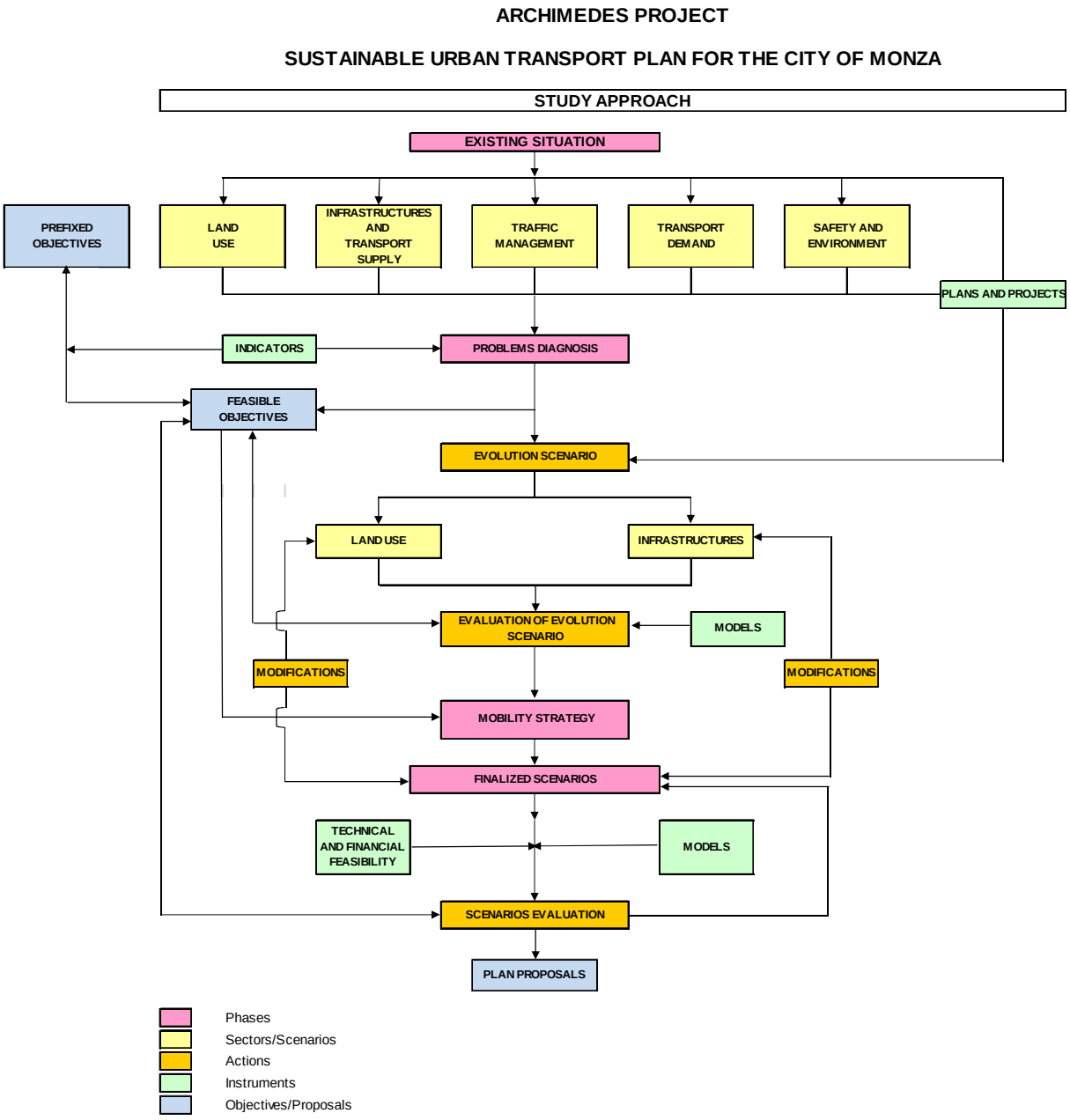


Figure 2.1 - Study approach

For each scenario the SUTP feasible objectives have been quantified and evaluated; in particular the objectives concern:

- public transport accessibility and modal share;
- bike accessibility and modal share;
- alternative transport modes share (car pooling, car sharing);
- traffic flows;
- congestion;
- air pollution;
- energy consumption;

- noise;
- road accidents.

The feasible objectives have then been compared with the prefixed SUTP objectives.

4.3 The Existing Situation

4.3.1 Land Use

The hybrid bus was immediately put into operation on Line Z206, one of the most frequented PT lines in Monza, whose route covers one of the two CIVITAS Corridors, as depicted in red in figure 6.

Monza Municipality has 120,000 inhabitants – a figure that has been quite stable over the past 30 years whereas it had nearly doubled in the previous 30 years. The number of employees is over 50.000 which has increased by more than 10% in the past 20 years.

Monza has a strong concentration of urban functions in the City Centre (mainly commercial and services) and along three main directions: to south-west (Milan), to north-west and to east (Figure 3.1.1).

Monza has a very important green area, mainly in the north (Monza Park).

Monza is located in the Metropolitan Area of Milan, only few kilometres away from Milan Municipality in the middle of one of the most urbanized and high income areas of Italy.

Despite its proximity to Milan, Monza is not a satellite town; in fact Monza is its own metropolitan area within the metropolitan area of Milan: Monza urban importance recently led to the creation of Monza Provincia.

4.3.2 Road System

Monza is located just in proximity to the A4 Motorway of East-West Corridor V Torino-Venezia (Figure 3.2.1). Southbound traffic reaches Monza via the Milan Ring, while northbound traffic reaches Monza via the Milano-Lecco Motorway or Milan-Lecco and Milan-Como Expressways. This important Motorway/Expressway system suffers serious congestion due to the huge increase of traffic in the past years.

The urban road system also suffers serious congestion due to the increasing traffic, the lack of a complete ring road (the northern part is completely missing) and a radial network which tends to direct all traffic to the City Centre.

4.3.3 Traffic Control in the City Centre

Monza has a very wide and attractive pedestrian area surrounded by an internal ring road which is unable to cope with its traffic because of capacity limits and environmental characteristics (Figure 3.3.1).

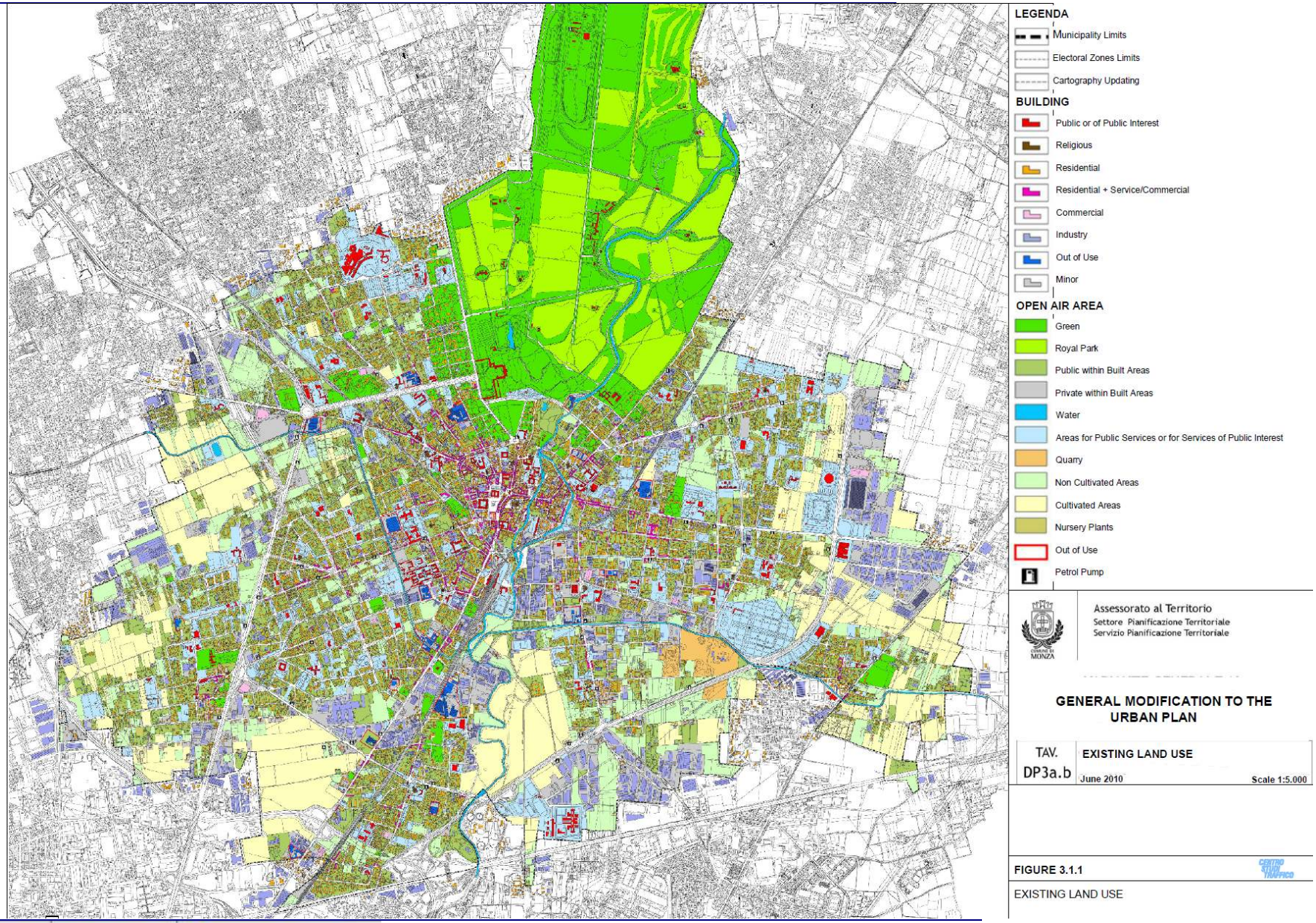


FIGURE 3.1.1

EXISTING LAND USE

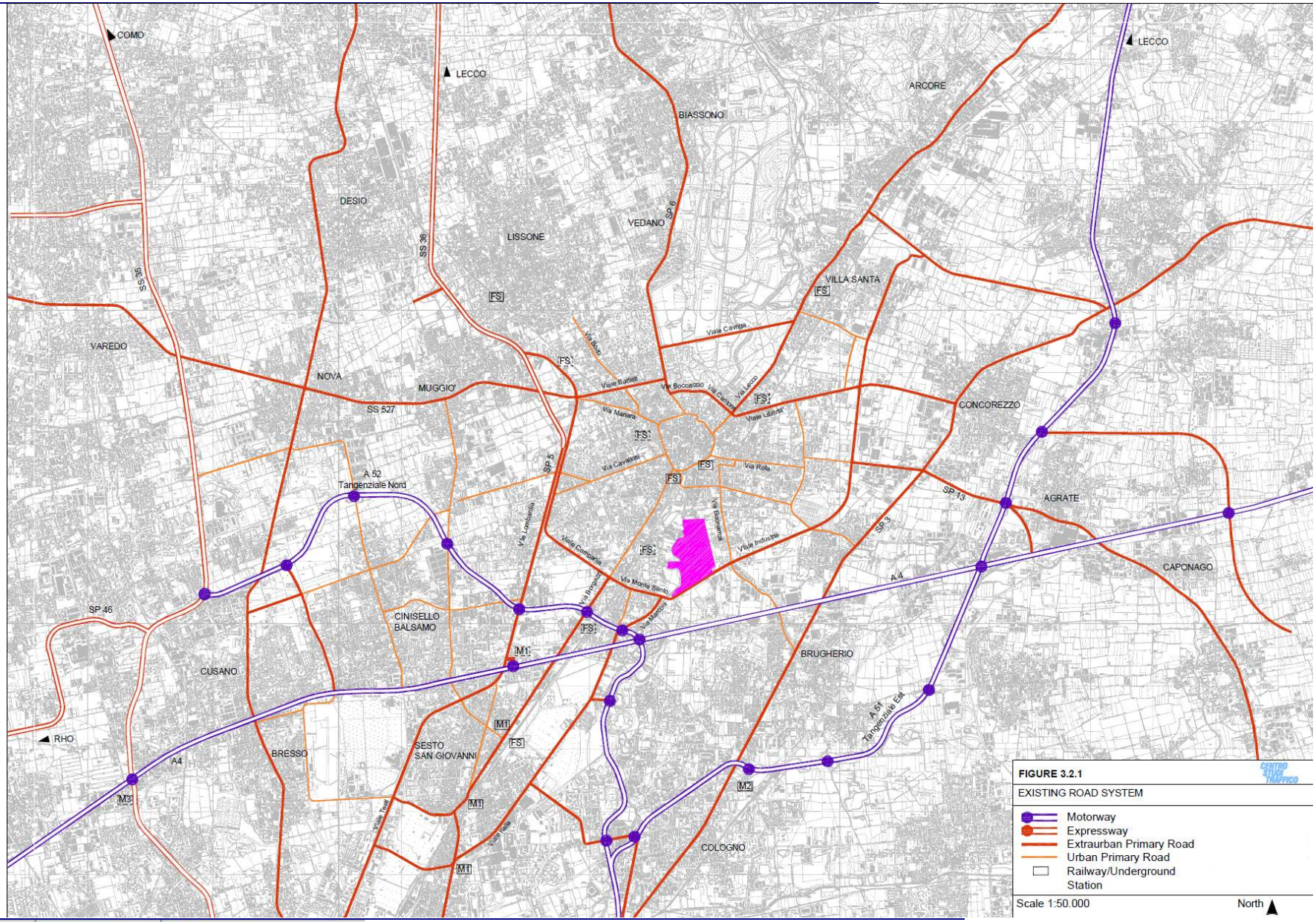


FIGURE 3.2.1

EXISTING ROAD SYSTEM

- Motorway
- Expressway
- Extraurban Primary Road
- Urban Primary Road
- Railway/Underground Station

Scale 1:50.000 North

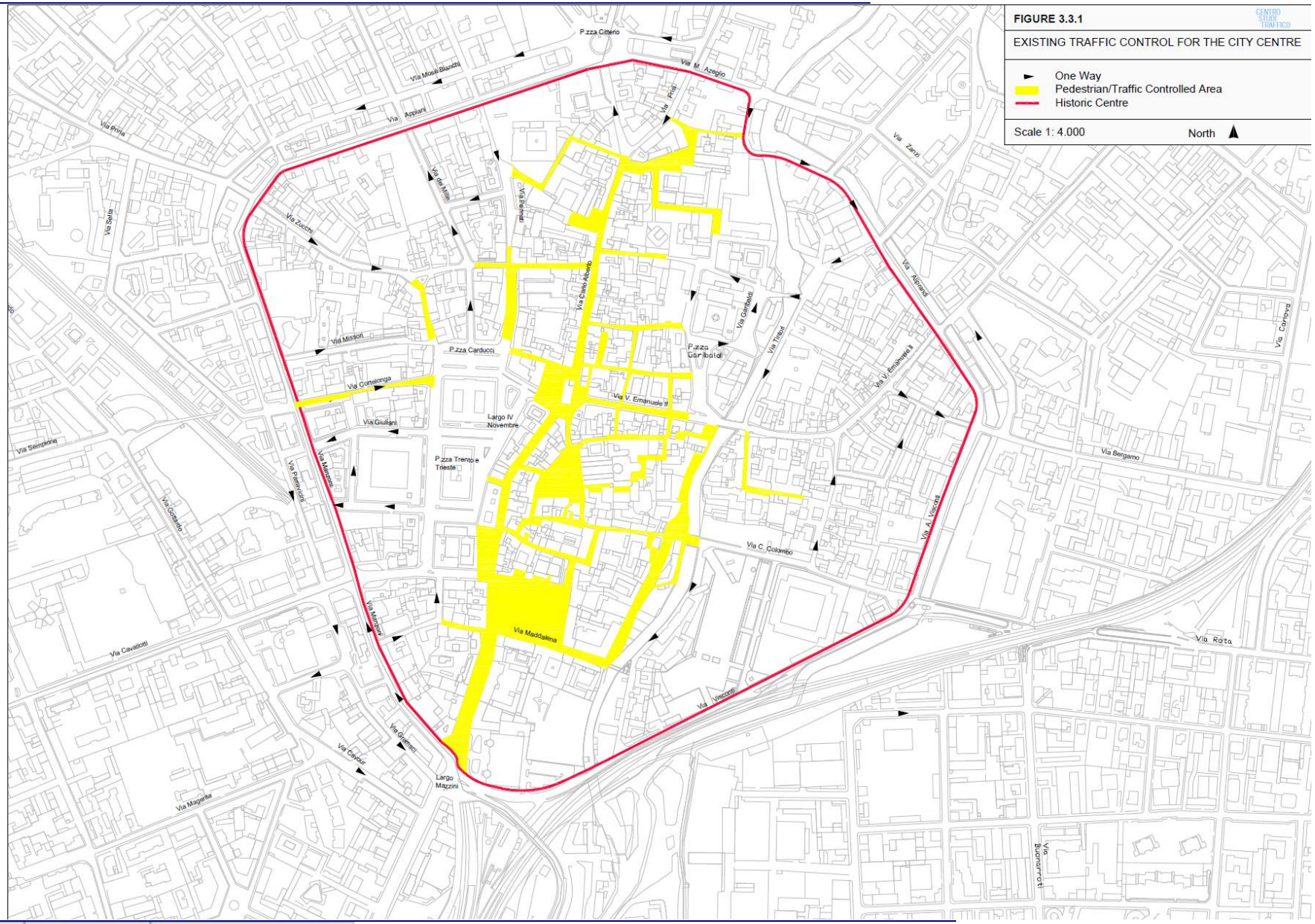


FIGURE 3.3.1
EXISTING TRAFFIC CONTROL FOR THE CITY CENTRE
One Way
Pedestrian/Traffic Controlled Area
Historic Centre
Scale 1: 4.000
North
P.zza Citterio
Via M. Azeglio
Via Mosè Bianchi
Via Appiani
Via Pirria
Via Zucchi
Via Misson
P.zza Carducci
Via Cornelonga
Via Giuliani
Largo IV Novembre
P.zza Trento e Trieste
Via V. Emanuele II
P.zza Garibaldi
Via Garibaldi
Via Tridoi
Via Cinto Alberto
Via Pariset
Via Zara
Via Aprinai
Via Cornova
Via Bergamo
Via A. Vecchi
Via C. Colombo
Via Maddalena
Via Vecchi
Via Rota
Via Buonarroti
Via Cavallotti
Via Cavour
Via Giovanni
Largo Mazzini
Via Magenta
Via Sernicone
Via Gattaleo
Via Pietravorni
Via Marconi
Via Sella

4.3.4 Traffic Flows

Monza road system suffers of heavy congestion problems due to the very high flows, with more than 6.000 vehicles in the morning peak hour in the western side of the external ring, and due to the insufficient streets capacity mainly in the northern side of the external ring and in the internal ring (Figure 3.4.1).

26% of the morning peak traffic of Monza Municipality is through traffic; 3% is the extra-Municipality through traffic of the City Centre (origin and destination external to Monza Municipality) (Figure 3.4.2) while the total through traffic of the City Centre is 66% of total traffic crossing the Centre (origin and destination external to City Centre).

4.3.5 Parking

Monza City Centre and surroundings has 12.000 public parking spaces, more than 80% of which are free of charge (Figure 3.5.1). Occupancy rates in the City Centre are very high (greater than 1) while capacity reserves are still available around the City Centre mainly east and south.

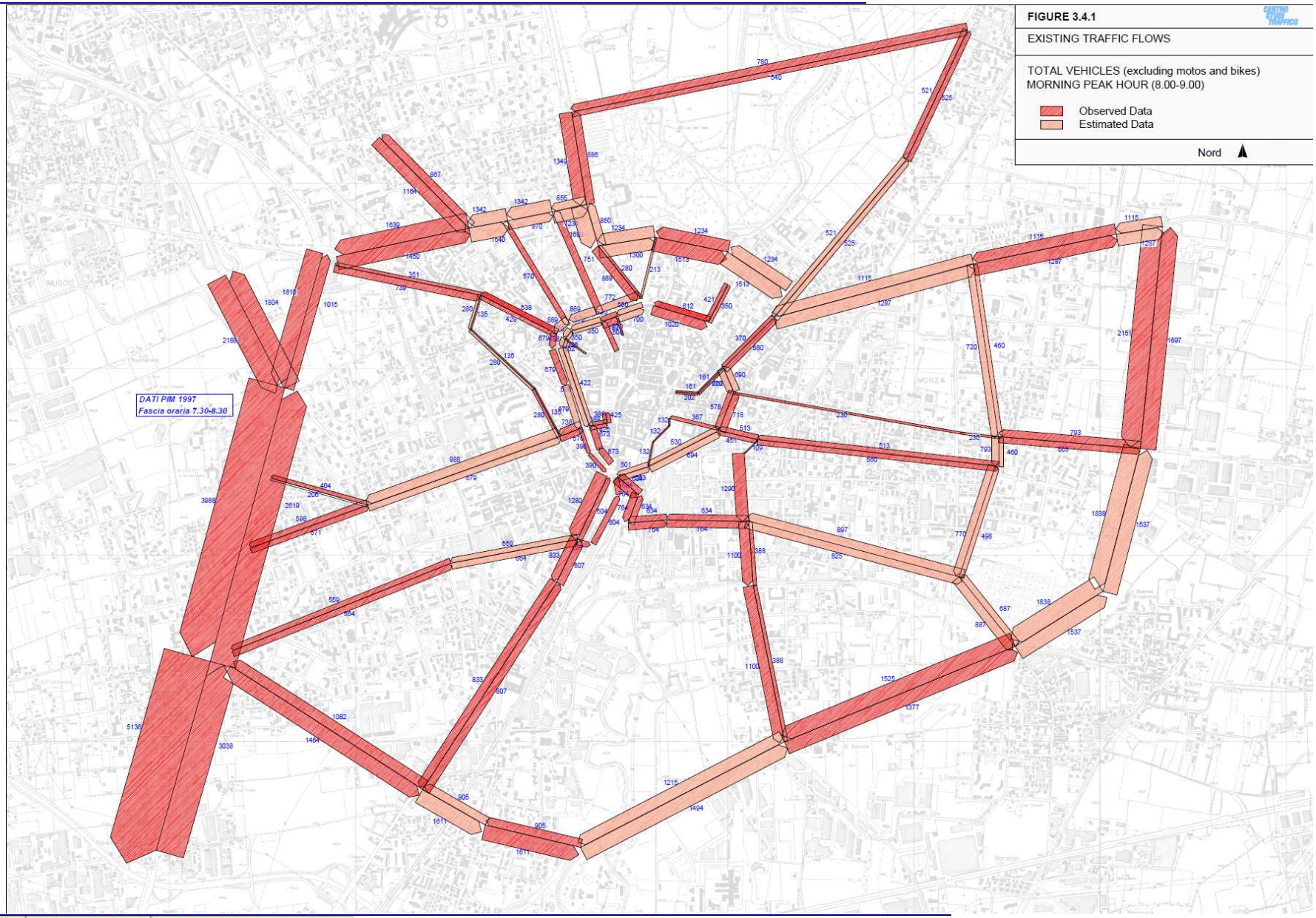
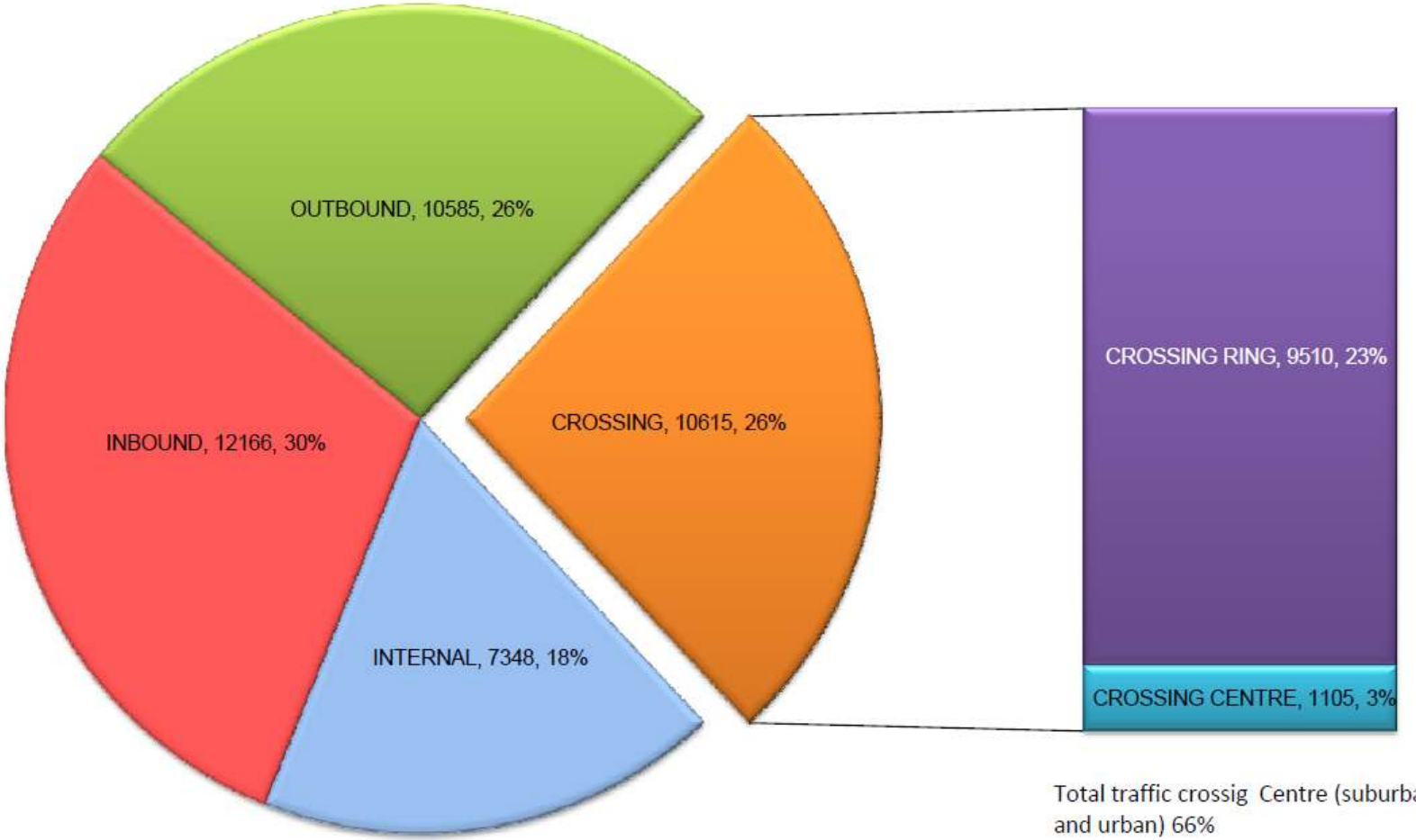
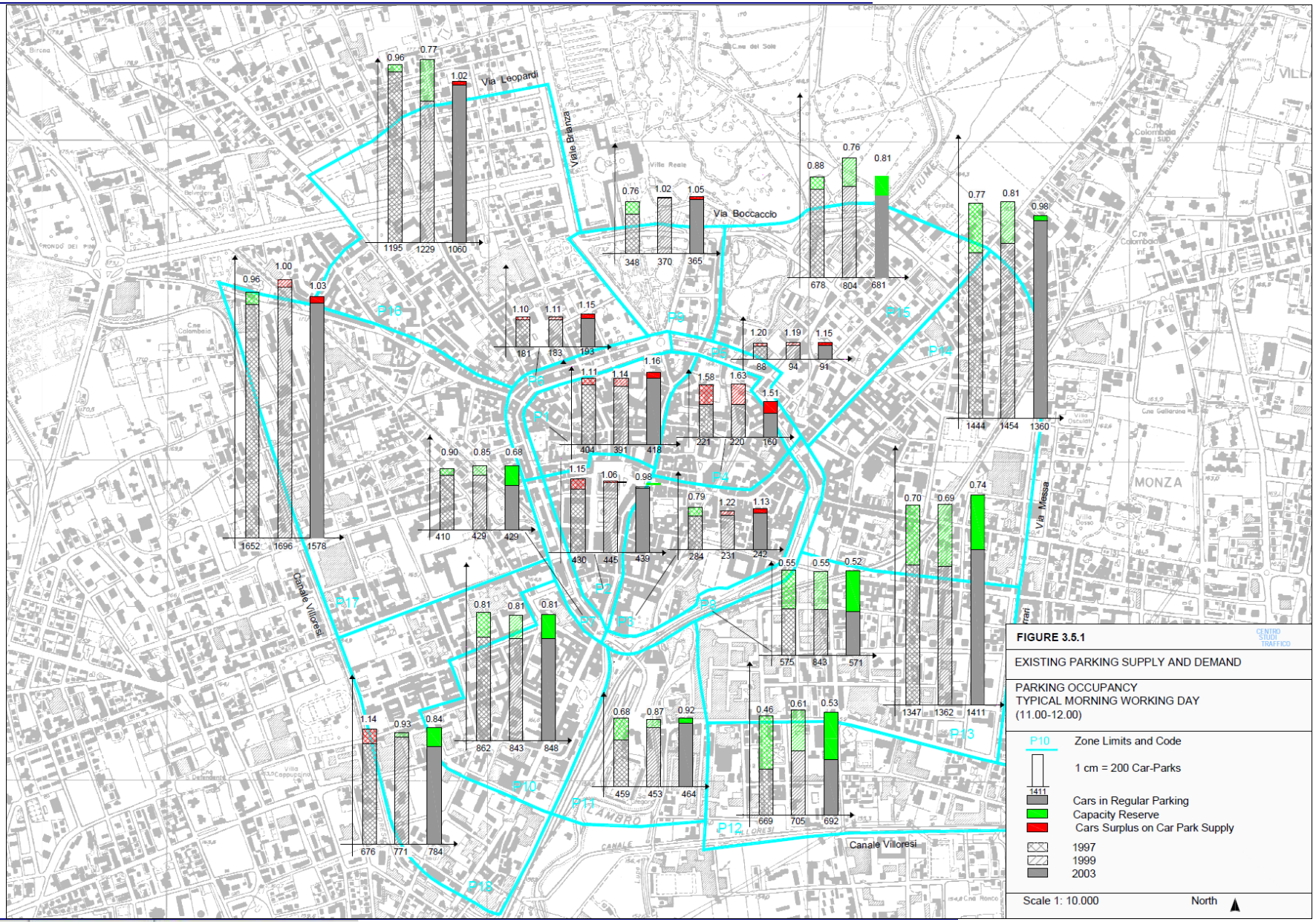


FIGURE 3.4.1
EXISTING TRAFFIC FLOWS
TOTAL VEHICLES (excluding motos and bikes)
MORNING PEAK HOUR (8.00-9.00)
Observed Data
Estimated Data
Nord
DATI PIM 1997
Fascia oraria 7.30-8.30

FIGURE 3.4.2 - EXISTING TRAFFIC - PEAK HOUR 7.45-8.45



Total traffic crossig Centre (suburban and urban) 66%


Via Leopardi
Viale Brianza
Via Boccaccio
Via Messa
Canale Villoresi
MONZA
P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11
P12
P13
P14
P15
P16
P17
P18
0.96 0.77 1.02
1195 1229 1060
0.76 1.02 1.05
348 370 365
0.88 0.76 0.81
678 804 681
0.77 0.81 0.98
1444 1454 1360
0.96 1.00 1.03
1652 1696 1578
1.10 1.11 1.15
181 183 193
1.20 1.19 1.15
88 94 91
1.11 1.14 1.16
404 391 418
1.58 1.63 1.51
221 220 160
0.90 0.85 0.68
410 429 429
1.15 1.06 0.98
430 445 439
0.79 1.22 1.13
284 231 242
0.70 0.69 0.74
1347 1362 1411
0.55 0.55 0.52
575 843 571
0.81 0.81 0.81
862 843 848
1.14 0.93 0.84
676 771 784
0.68 0.87 0.92
459 453 464
0.46 0.61 0.53
669 705 692
FIGURE 3.5.1
CENTRO STUDI TRAFFICO
EXISTING PARKING SUPPLY AND DEMAND
PARKING OCCUPANCY
TYPICAL MORNING WORKING DAY
(11.00-12.00)
P10 Zone Limits and Code
1 cm = 200 Car-Parks
1411
Cars in Regular Parking
Capacity Reserve
Cars Surplus on Car Park Supply
1997
1999
2003
Scale 1: 10.000
North

4.3.6 Public Transport

Monza is not connected to the Milan underground system; Monza is crossed by a very important railway line which having just one station (a second station is very low service) and irregular trains doesn't represent a competitive transport system especially for the travel demand directed to Monza (Figure 3.6.1).

The urban public transport system is based on bus services (Figure 3.6.2) with problems of low commercial speed and losing passengers.

4.3.7 Cycling

Monza Municipality is developing a cycling network as priority over other actions that are designed to encourage this form of transport (e.g. bike sharing). The reason for this is that the current traffic conditions, which are exacerbated by low street capacity, heavy car traffic and on-street parking, make it impossible for car traffic and cyclists to use the same streets outside the City Centre (Figure 3.7.1).

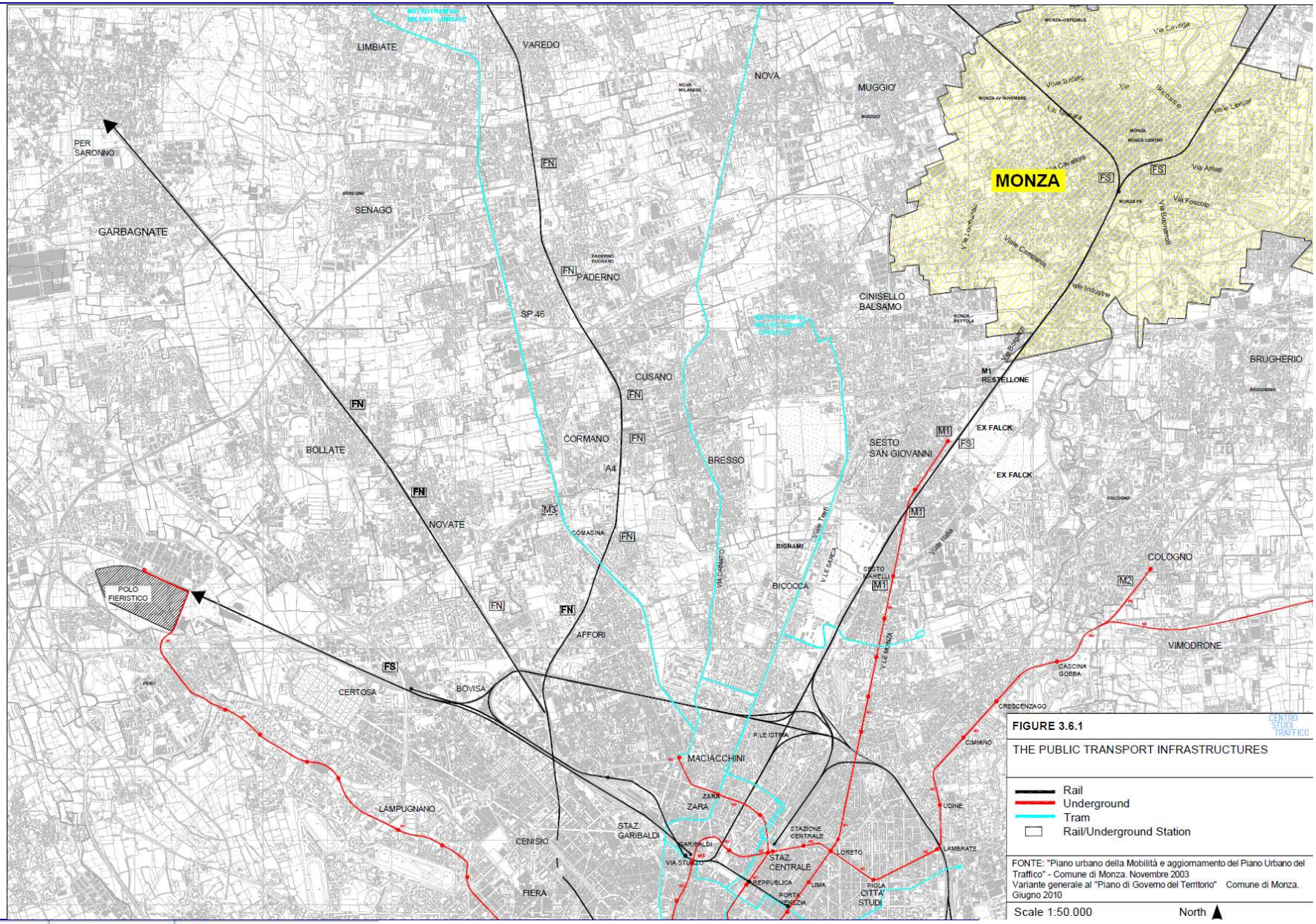


FIGURE 3.6.1

THE PUBLIC TRANSPORT INFRASTRUCTURES

Rail
Underground
Tram
Rail/Underground Station

FONTE: "Piano urbano della Mobilità e aggiornamento del Piano Urbano del Traffico" - Comune di Monza. Novembre 2003
Variante generale al "Piano di Governo del Territorio" Comune di Monza. Giugno 2010

Scale 1:50.000 North

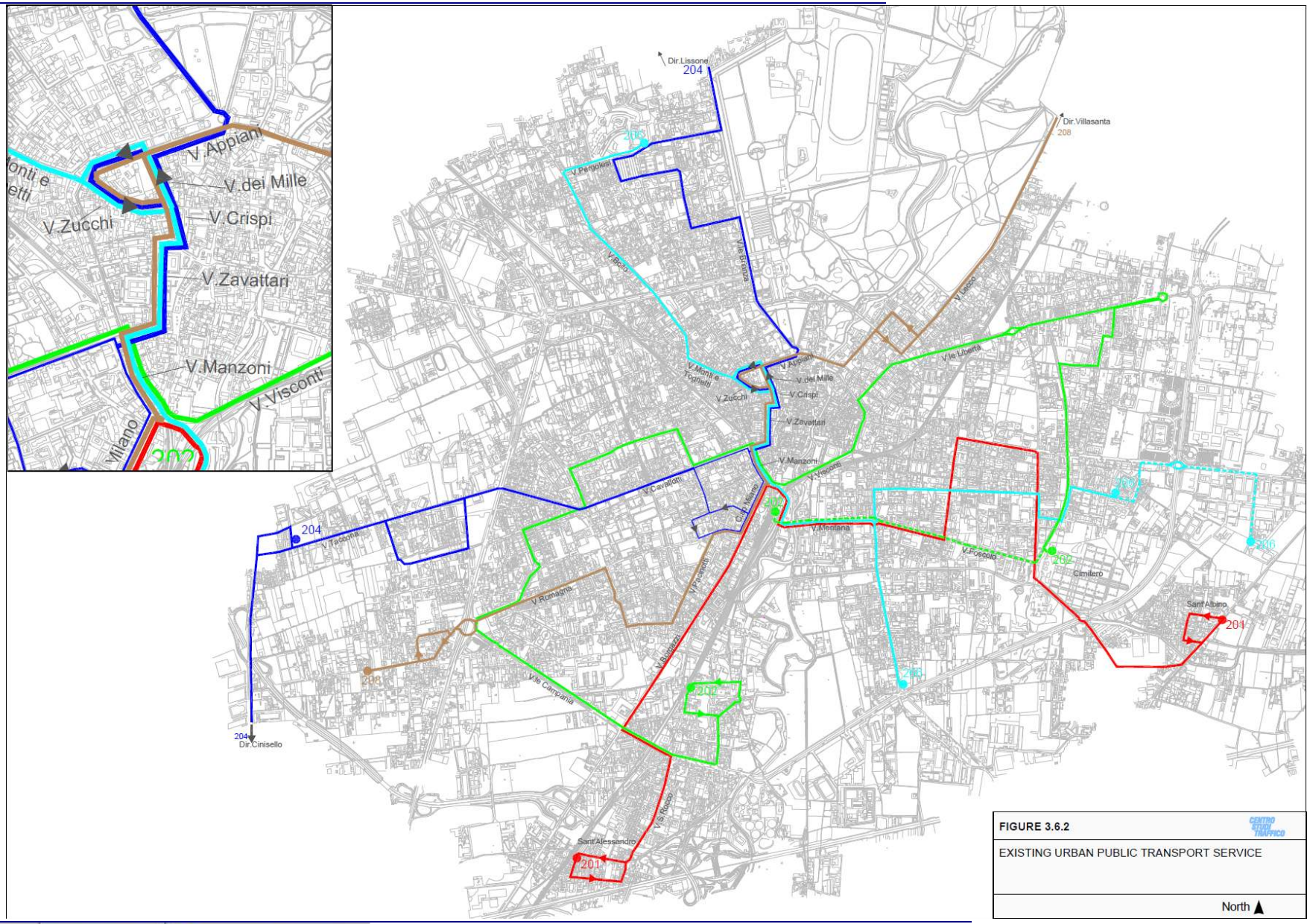


FIGURE 3.6.2

EXISTING URBAN PUBLIC TRANSPORT SERVICE

North ▲

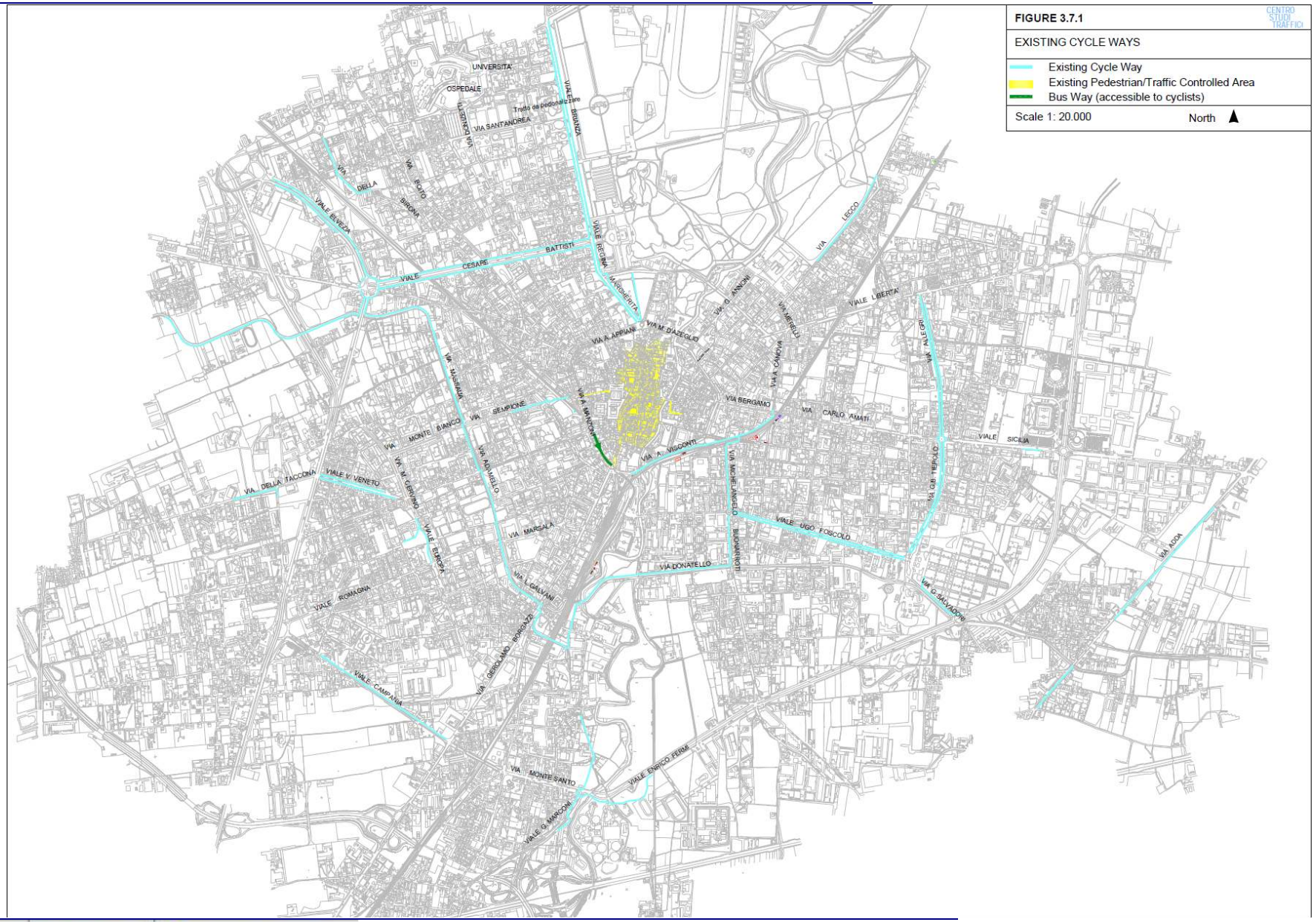


FIGURE 3.7.1
CENTRO STUDI TRAFFICI
EXISTING CYCLE WAYS
Existing Cycle Way
Existing Pedestrian/Traffic Controlled Area
Bus Way (accessible to cyclists)
Scale 1: 20.000
North
UNIVERSITA'
OSPEDALE
VIA SANTANDREA
VIA DELLA BIRONA
VIALE ENVEZA
VIALE CESARE BATTISTI
VIALE REGINA MARGHERITA
VIA A. APPIANI
VIA M. D'AZEGLIO
VIA G. ANCONI
VIA MERELLO
VIA A. CANOVA
VIALE LIBERTA'
VIA LECCO
VIA ALEGHI
VIA BERGAMO
VIA CARLO AMATI
VIALE SICILIA
VIA A. VISCONTI
VIA MICHELANGELO BUONARROTI
VIALE UGO FOSCOLO
VIA GB TIEPOLO
VIA ADDA
VIA G. SALVADORI
VIA DONATELLO
VIA MARSALA
VIA L. GALVANI
VIA GIROLAMO BORGONZI
VIALE ROMAGNA
VIALE CAMPANIA
VIALE ENRICO FERMI
VIA MONTE SANTO
VIALE G. MARCONI
VIA MONTE BIANCO
VIA SEMPIONE
VIA ADUA
VIA MASSAUA
VIA M. CERVINO
VIALE EUROPA
VIA DELLA TACCONA
VIALE V. VENETO

4.3.8 Pedestrians

Monza City Centre offers a very wide and attractive pedestrian area; unfortunately outside the City Centre there are pedestrian safety problems, mainly due to lack of sufficient width of the pavements (Figure 3.8.1).

4.3.9 Travel Demand

At the present, travel demand serving Monza Municipality is dominated by use of private cars, with 74% modal share in morning peak hour (Figure 3.9.1); public transport has 13% modal share, bike 3.6% and walking 4.2% (all for trips over 20 minutes).

The 2010 origin/destination private cars matrix with 156 zones has been considered as existing travel demand for the base year scenario.

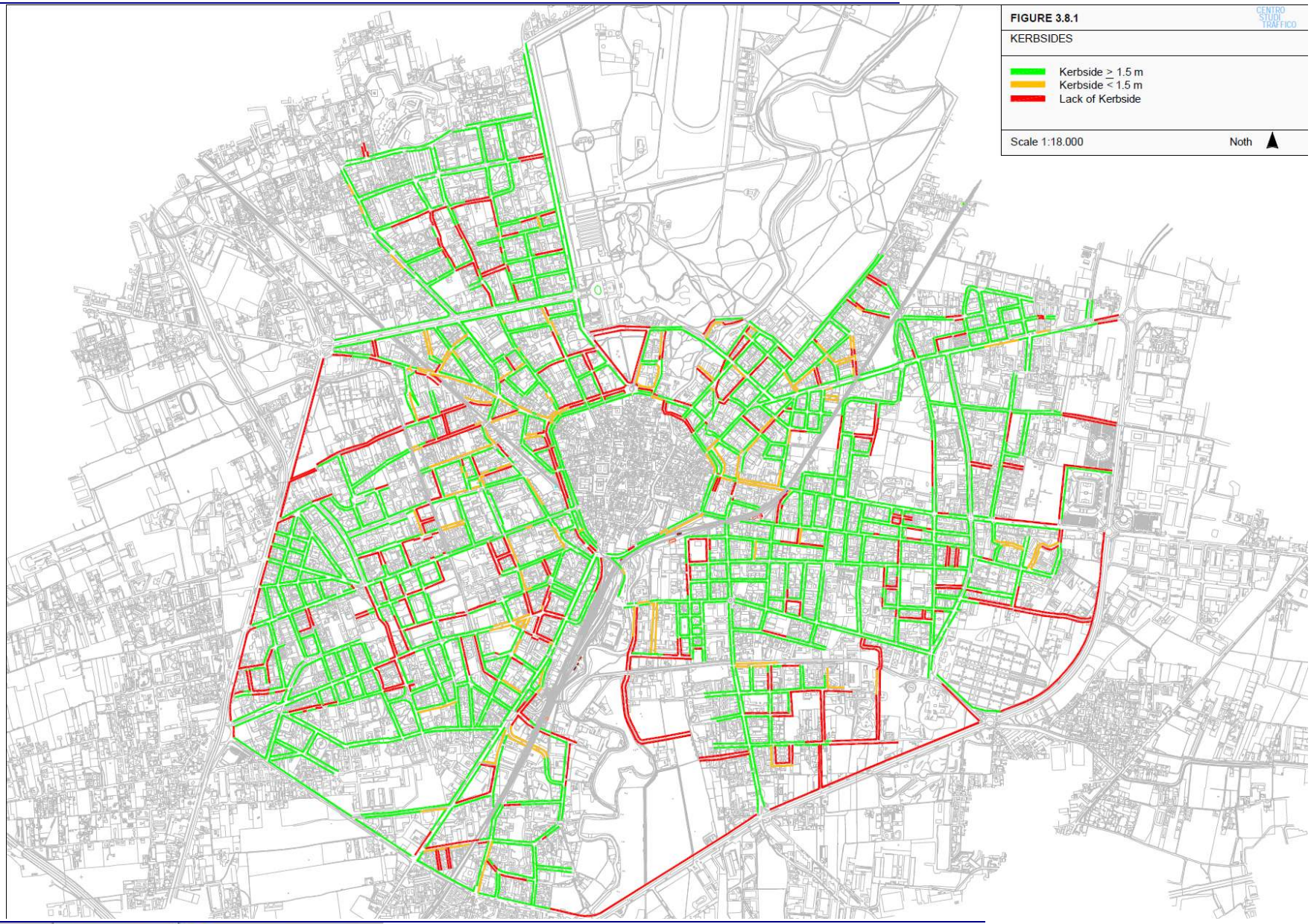
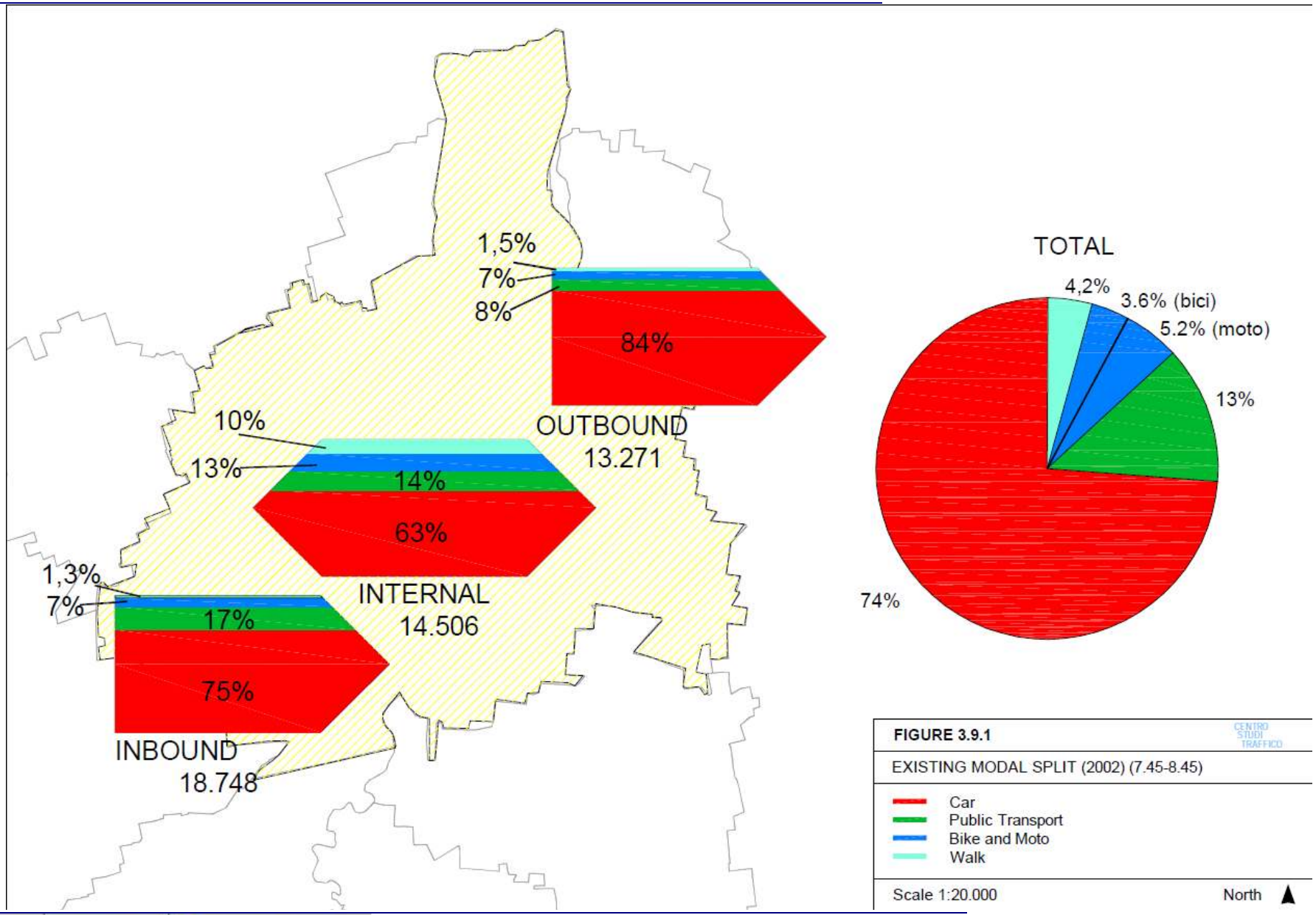


FIGURE 3.8.1
CENTRO STUDI TRAFFICO
KERBSIDES
Kerbside ≥ 1.5 m
Kerbside < 1.5 m
Lack of Kerbside
Scale 1:18.000
Noth


1,5%
7%
8%
84%
OUTBOUND
13.271
10%
13%
14%
63%
INTERNAL
14.506
1,3%
7%
17%
75%
INBOUND
18.748
TOTAL
4,2%
3.6% (bici)
5.2% (moto)
13%
74%
FIGURE 3.9.1
CENTRO STUDI TRAFFICO
EXISTING MODAL SPLIT (2002) (7.45-8.45)
Car
Public Transport
Bike and Moto
Walk
Scale 1:20.000
North

4.3.10 Environment

Monza suffers critical noise problems with heavy excesses of legal limits (Figure 3.10.1). Also, even limited data on air pollution show critical excesses of legal limits (Figure 3.10.2-3.10.3).

4.3.11 Road Accidents

Monza's road safety problems have been improving in the past years (Figure 3.11.1) but even after this improvement the figures are still insufficient to reach European objectives.

The detailed knowledge of road accident location and causes represents a very important basis for building a Road Safety Plan (Figure 3.11.2).

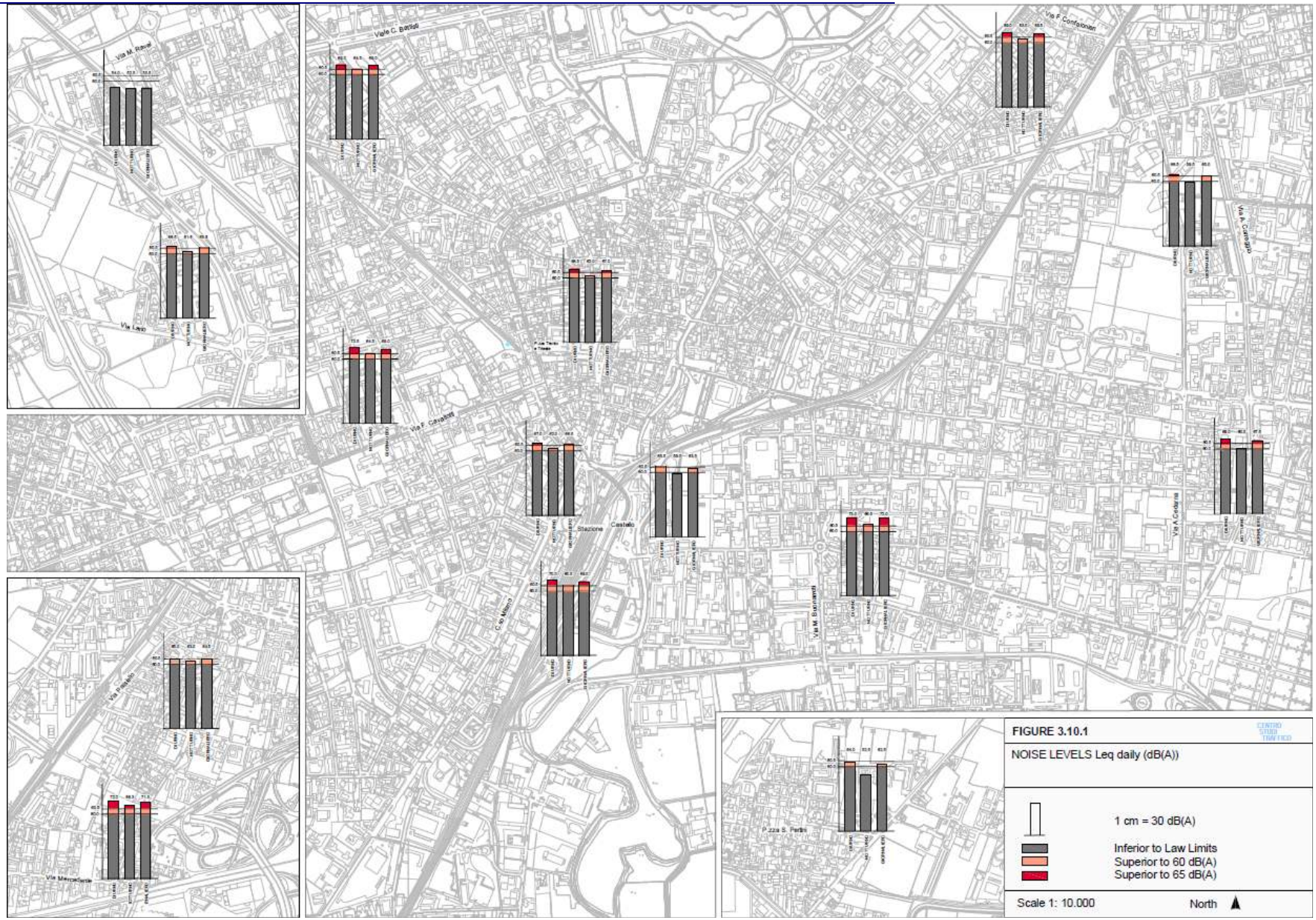
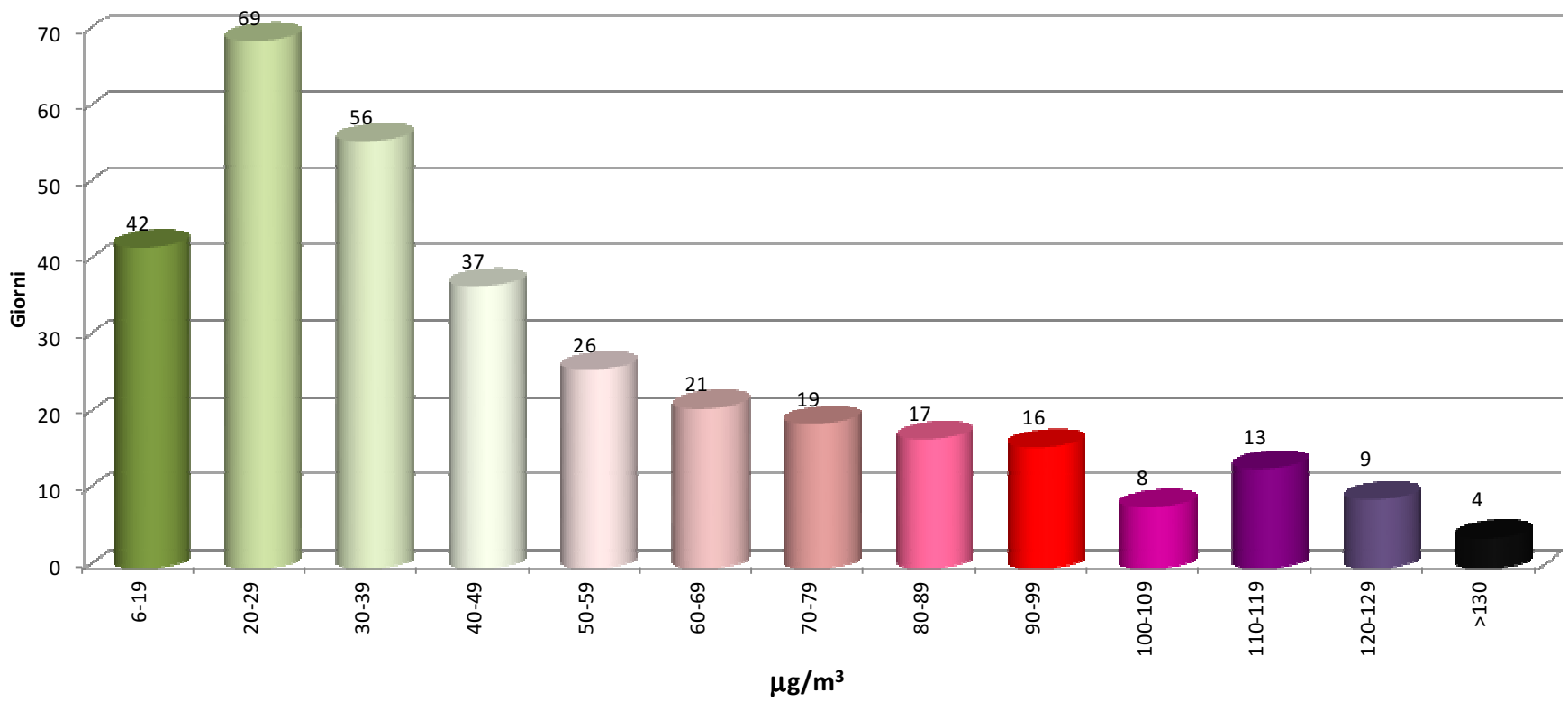


FIGURE 3.10.1
NOISE LEVELS Leq daily (dB(A))
1 cm = 30 dB(A)
Inferior to Law Limits
Superior to 60 dB(A)
Superior to 65 dB(A)
Scale 1: 10.000
North

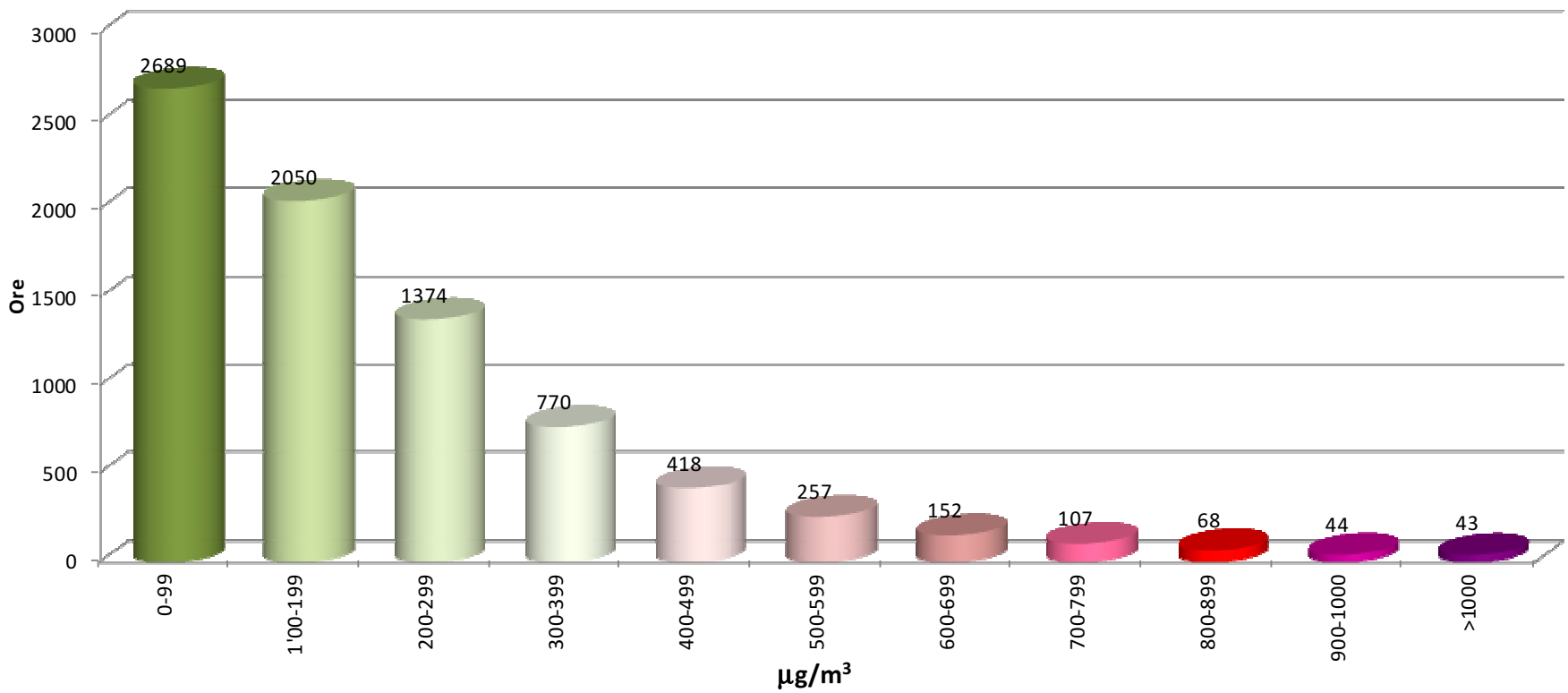
FIGURE 3.10.2 - Daily PM10 Concentration Via Machiavelli (2007)



µg/m³	6-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100-109	110-119	120-129	>130	Total	ND	Total + ND
Days	42	69	56	37	26	21	19	17	16	8	13	9	4	337	28	365
Days	204				133											

Legal limit: 50 µg/m3 maximum number of days accepted in the year: 35

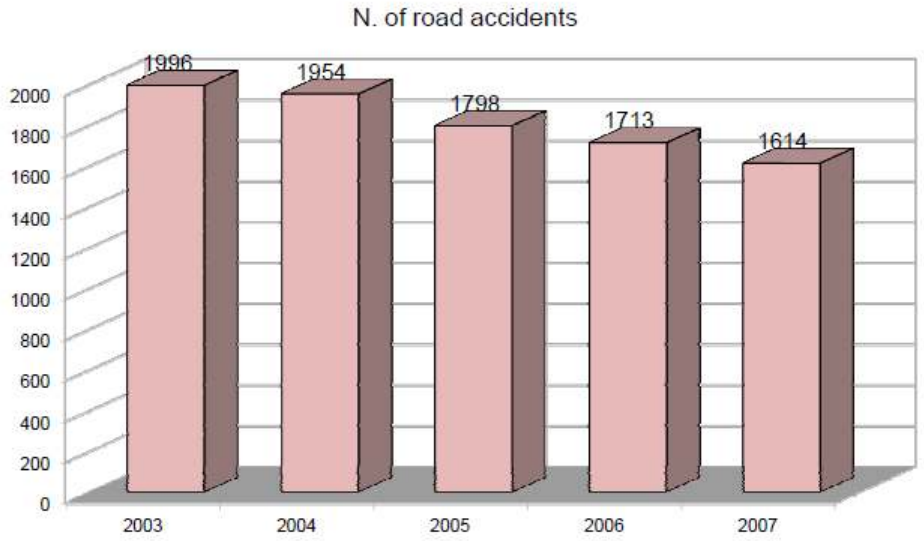
FIGURE 3.10.3 - Hourly NOx Concentrations Via Machiavelli (2007)

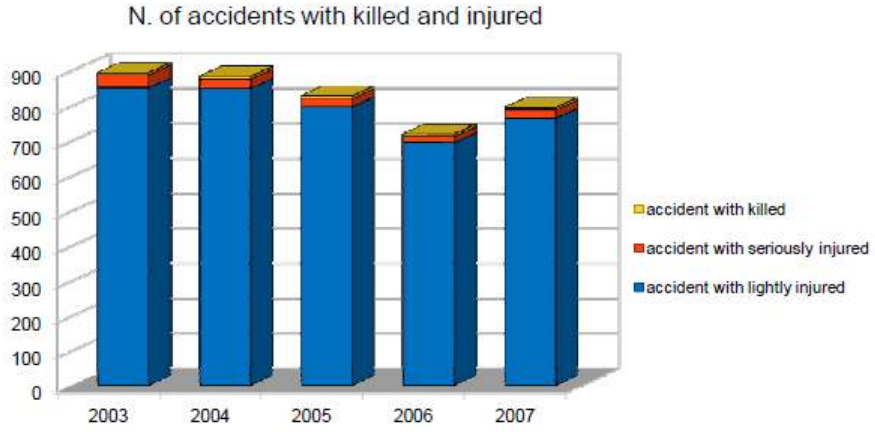


µg/m³	0-99	1'00-199	200-299	300-399	400-499	500-599	600-699	700-799	800-899	900-1000	>1000	ND	Total
Hours	2689	2050	1374	770	418	257	152	107	68	44	43	788	**8760**
Hours	6883				1089								

Law limits: 400 µg/m3

FIGURA 3.11.1 - ROAD ACCIDENTS TRENDS IN MONZA 2003-2007





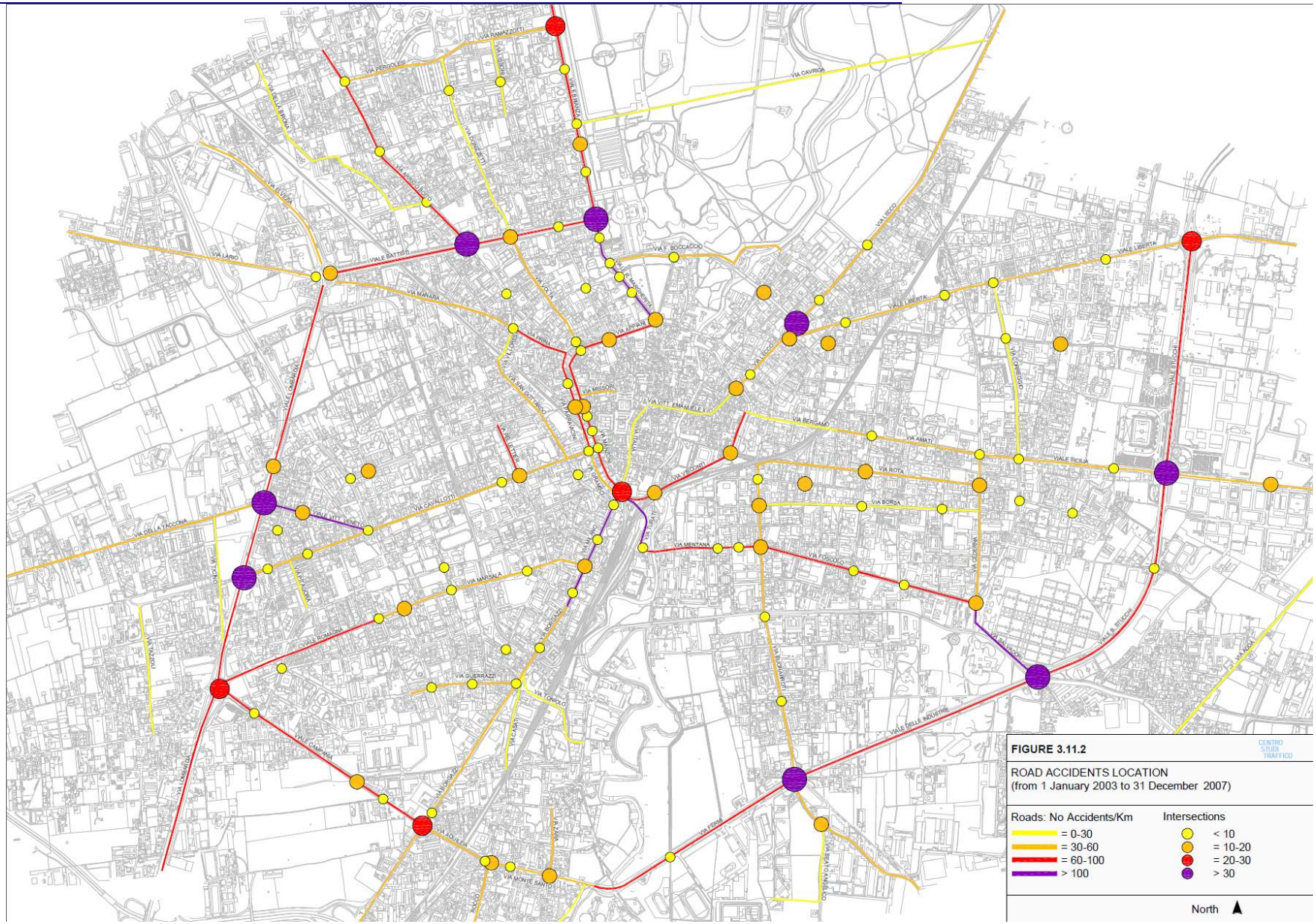


FIGURE 3.11.2
CENTRO STUDI TRAFFICO
ROAD ACCIDENTS LOCATION
(from 1 January 2003 to 31 December 2007)
Roads: No Accidents/Km
= 0-30
= 30-60
= 60-100
> 100
Intersections
< 10
= 10-20
= 20-30
> 30
North

4.4 Future Travel Demand

4.4.1 The 2021 Travel Demand

In 2021 scenario all urban plans and projects submitted to Monza Municipality have been considered (Figure 4.1.1): they include 555.000 sqm (floor area) for 5.000 new inhabitants (+4.1%) and 5.300 new employees (+10.5%) with an increase of 6.7% % of travel demand.

The 2021 origin/destination matrix has been estimated on the basis of the existing matrix and on the basis of new travel demand in origin and destination of various zones.

4.4.2 The 2031 Travel Demand

In 2031 travel demand all PGT (Urban Plan) land use proposals have been considered (Figure 4.2.1): they include 1.560.000 sqm (floor area) additional to 2021 for 16.700 new inhabitants from base year (+13.9%) and 22.800 new employees from base year (+43.5%) with an increase of 26.1% of travel demand.

The 2031 origin/destination matrix has been estimated on the basis of 2021 matrix and on the basis of new travel demand in origin and destination of various zones.

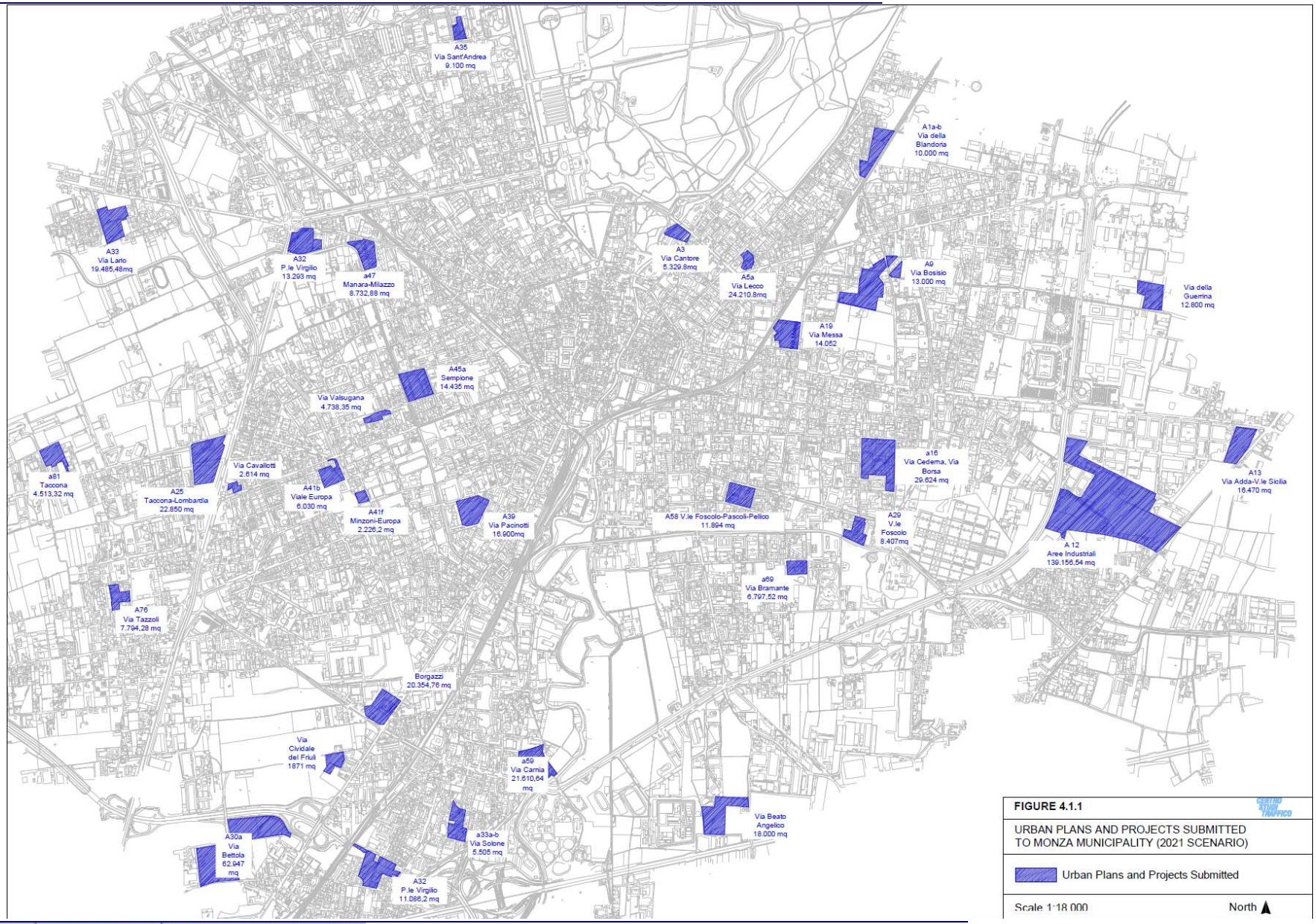


FIGURE 4.1.1

URBAN PLANS AND PROJECTS SUBMITTED TO MONZA MUNICIPALITY (2021 SCENARIO)

Urban Plans and Projects Submitted

Scale 1:18 000 North ▲

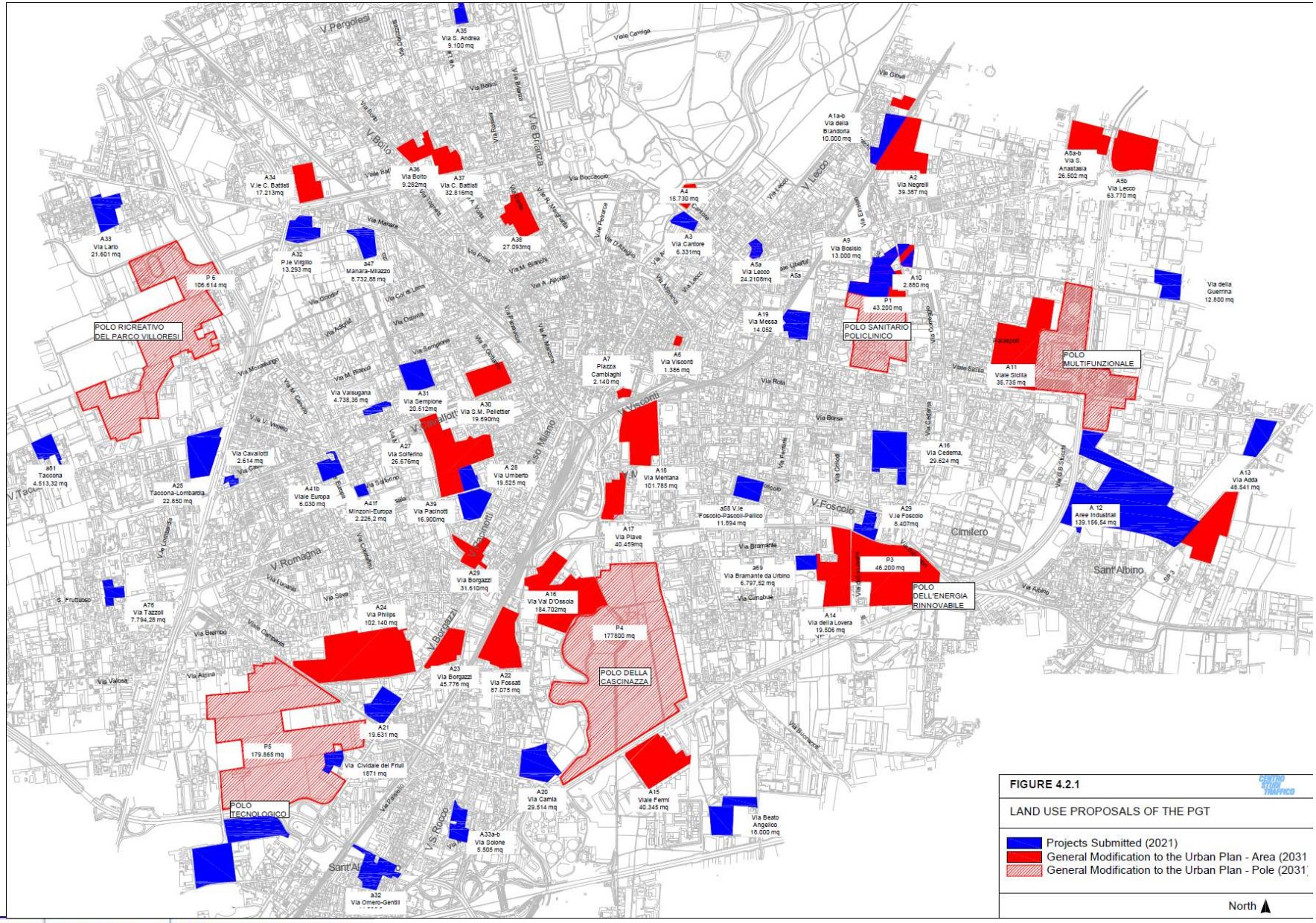


FIGURE 4.2.1

LAND USE PROPOSALS OF THE PGT

- Projects Submitted (2021)
- General Modification to the Urban Plan - Area (2031
- General Modification to the Urban Plan - Pole (2031

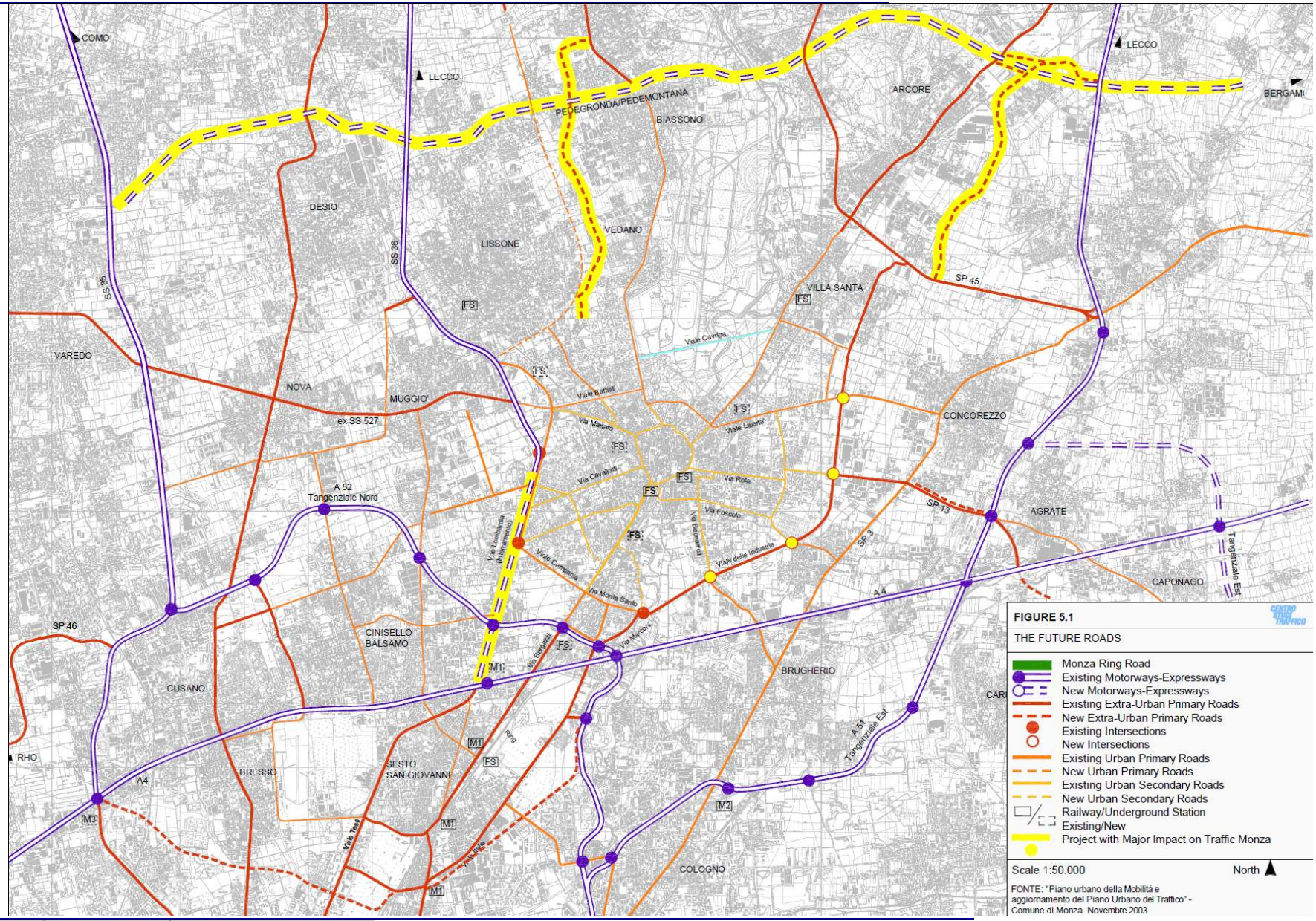
North

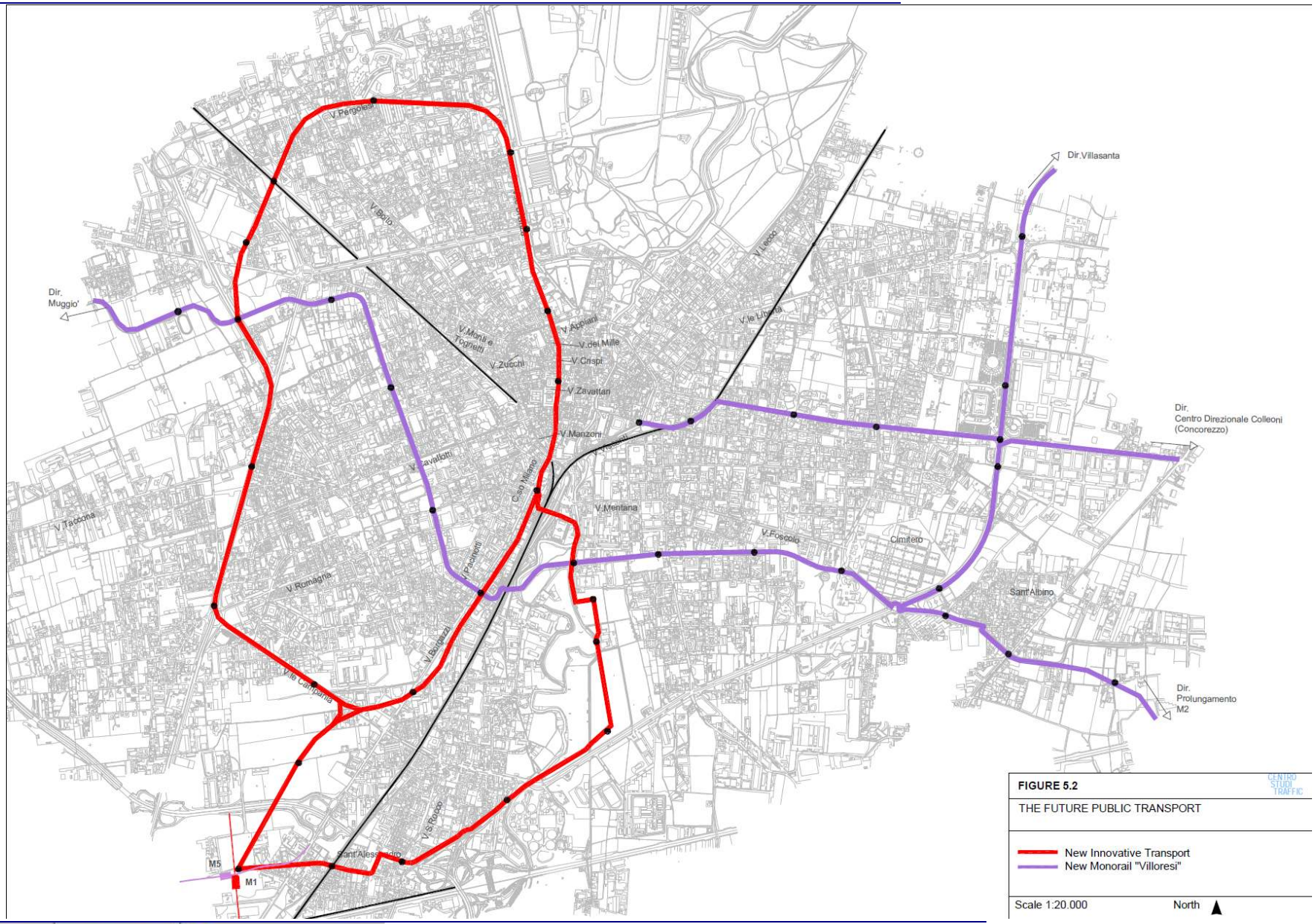
4.5 Future Infrastructure Scenarios

The infrastructure forecasts of existing plans have been integrated with new proposals concerning public transport and cycle ways in order to make these modes more competitive to private cars in satisfying the existing travel demand and the travel demand generated by new settlements (Figure 5.1-5.3).

In particular the future public transport system is based on innovative technology to provide high standard service levels in order to compete with private car traffic in a high income contest.

The future cycle ways scenario offers accessibility to all main urban settlements existing and planned thus is able to guarantee safety to most of potential urban cycle trips.


COMO
LECCO
PEDEGRONDA/PEDEMONTANA
BIASSONO
ARCORE
BERGAMO
DESIO
LISSONE
VEDANO
SS 36
VILLA SANTA
SP 45
VAREDO
NOVA
MUGGIO'
ex SS 527
CONCOREZZO
A 52
Tangenziale Nord
SP 13
AGRATE
SP 3
CAPONAGO
Tangenziale Est
A 4
SP 46
CINISELLO
BALSAMO
CUSANO
BRUGHERIO
RHO
BRESSO
SESTO
SAN GIOVANNI
A 51
COLOGNO
M1
M2
M3
FS
FIGURE 5.1
THE FUTURE ROADS
Monza Ring Road
Existing Motorways-Expressways
New Motorways-Expressways
Existing Extra-Urban Primary Roads
New Extra-Urban Primary Roads
Existing Intersections
New Intersections
Existing Urban Primary Roads
New Urban Primary Roads
Existing Urban Secondary Roads
New Urban Secondary Roads
Railway/Underground Station
Existing/New
Project with Major Impact on Traffic Monza
Scale 1:50.000
North
FONTE: "Piano urbano della Mobilità e aggiornamento del Piano Urbano del Traffico" - Comune di Monza, Novembre 2003


Dir.Villasanta
Dir.
Muggio'
Dir.
Centro Direzionale Colleoni
(Concorezzo)
Dir.
Prolungamento
M2
V.Pergolesi
V.Borio
V.Monti e Tognetti
V.Zucchi
V.Appiani
V.del Mille
V.Crispi
V.Zavattari
V.Manzoni
V.Lecco
V.le Lombardia
V.Zavattari
Corso Milano
V.Mentana
V.Foscolo
Cimitero
Sant'Albino
V.Tacchona
V.Romagna
V.Padroni
V.Buragazzi
V.le Campania
V.S.Rocco
Sant'Alessandro
M5
M1
FIGURE 5.2
CENTRO STUDI TRAFFIC
THE FUTURE PUBLIC TRANSPORT
New Innovative Transport
New Monorail "Villoresi"
Scale 1:20.000
North

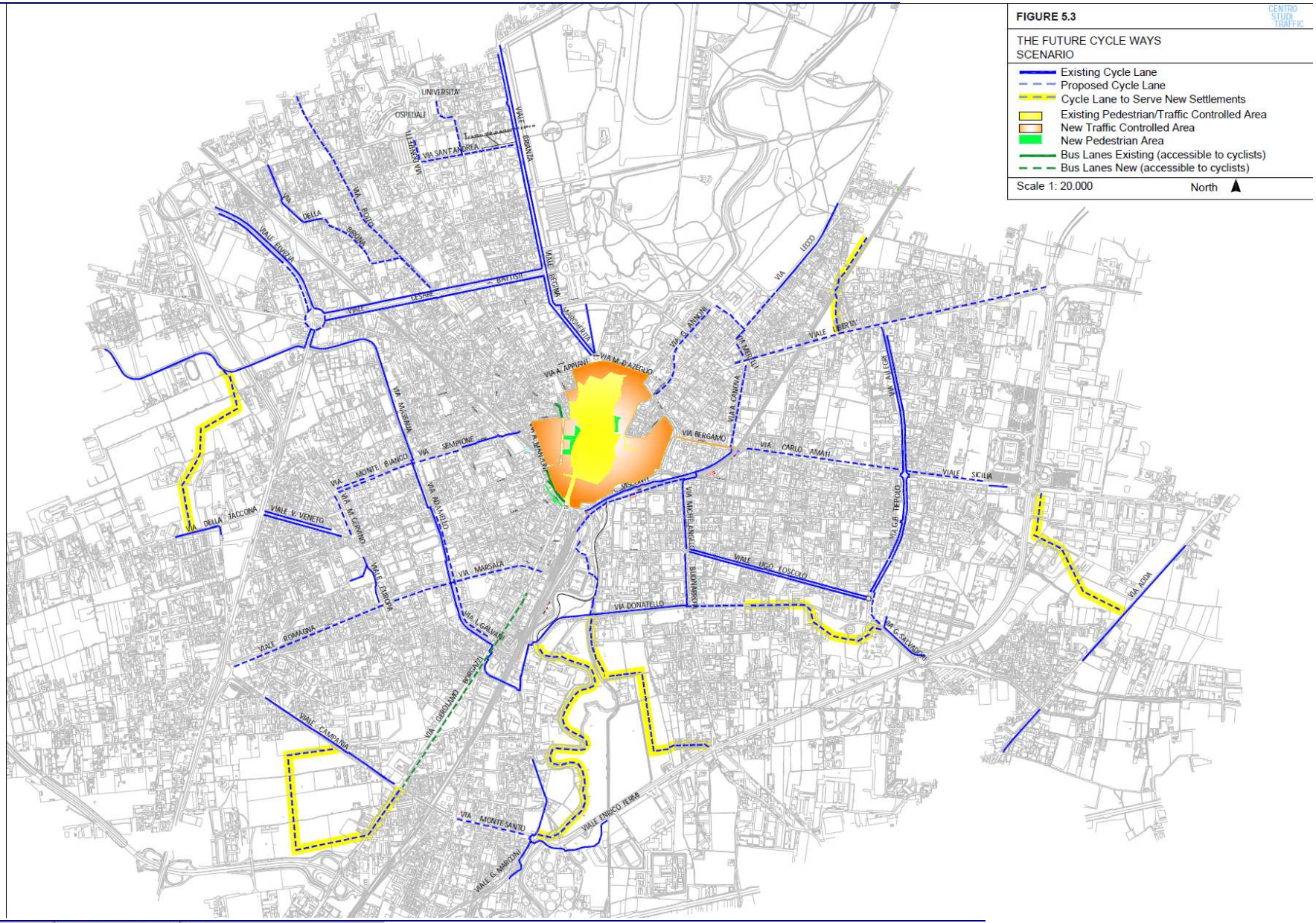


FIGURE 5.3
CENTRO STUDI TRAFFIC
THE FUTURE CYCLE WAYS SCENARIO
Existing Cycle Lane
Proposed Cycle Lane
Cycle Lane to Serve New Settlements
Existing Pedestrian/Traffic Controlled Area
New Traffic Controlled Area
New Pedestrian Area
Bus Lanes Existing (accessible to cyclists)
Bus Lanes New (accessible to cyclists)
Scale 1: 20.000
North
UNIVERSITA'
OSPEDALE
VIA SANT'ANDREA
VIA DEGASPERI
VIA DELLA BIONDA
VIALE EUROPA
VIALE ESPAÑA
VIALE BRONZA
VIALE REGINA MARGHERITA
VIA A. APPIANI
VIA M. D'AZEGLIO
VIA G. ANTONI
VIA PATRIELLI
VIALE LIBERTA'
VIA LECCO
VIA MAZZINI
VIA SEMPIONE
VIA MONTE BIANCO
VIA ADAMELLO
VIA MARSALA
VIA BERGAMO
VIA CARLO ANNATI
VIALE SICILIA
VIA DELLA TACCONA
VIALE V. VENETO
VIA M. GERMANO
VIALE EUROPA
VIA MICHELANGELO BUONARROTI
VIA G.B. TIEPOLO
VIALE UGO FOSCOLO
VIA DONATELLO
VIA ADDA
VIALE ROMAGNA
VIA GALVANI
VIA GIROLAMO BARONTINI
VIALE CAMPANIA
VIA MONTE SANTO
VIALE ENRICO FERMI
VIALE G. MARCONI

4.6 Potential Travel Demand which may be Transferred from Private Car to More Sustainable Transport Modes

4.6.1 Travel Demand which may be Transferred to Public Transport

Car trips with origin and destination at walking distance from public transport may be transferred to public transport, without interchange among bus lines and with interchange among new transport system lines.

The potential travel demand which may be transferred to public transport is 10% of existing car trips, of which 3% (concerning trips under 3 km) may be transferred also to walk and cycle (Figure 6.1).

4.6.2 Travel Demand which may be Transferred to Park and Ride

Commuters car trips directed to City Centre may be diverted to park and ride; this potential travel demand concerns 5% of existing car trips (Figure 6.1).

4.6.3 Travel Demand which may be Transferred to Walking

Car trips under 1.5 km may be transferred to walking; this potential travel demand concerns 3% of existing car trips which besides walk may be transferred also to public transport, cycle, car pooling and car sharing (Figure 6.1).

4.6.4 Travel Demand which may be Transferred to Cycling

Car trips within Monza Municipality may be transferred to cycle (over 3 km without competitive public transport); this potential travel demand concerns 18% of existing car trips which besides bike may be transferred also to walk, public transport, car pooling and car sharing (Figure 6.1).

4.6.5 Travel Demand which may be Transferred to Electric Car Sharing

Internal non-commuter car trips without a competitive public transport may be transferred to electric car sharing, for a potential travel demand of 3.5% of existing car trips which may be satisfied also by other transport modes.

4.6.6 Travel Demand which may be Transferred to Car Pooling

Internal commuters' car trips with the same origin and the same destination without a direct public transport service and without a cycle network may be transferred to car pooling. Moreover, commuters' car trips coming from outside Monza Municipality and directed to the City Centre may also be transferred to car pooling.

The total car pooling potential demand is 10% of existing car trips, which may of course also be transferred to other transport modes besides car pooling.

4.6.7 Travel Demand which may be Transferred from Private Car to more Sustainable Transport Modes

The total potential travel demand which may be transferred from private car to more sustainable transport modes is 38% of total car trips.

However, not all potential travel demand may be transferred, therefore feasible objectives of modal transfer in short term and in long term have been assumed (Figures 6.2-6.4):

- concerning public transport and park and ride a range of 20/40% and 40/60% transfer of the potential travel demand for minimum/maximum hypotheses in the short term and in the long term has been assumed;
- concerning walk and cycle a range of 5/40% and 10/60% transfer of potential travel demand for minimum/maximum hypotheses in the short term and in the long term has been assumed;
- concerning electric car sharing a range of 1/4% and of 2/20% transfer of potential travel demand for minimum/maximum hypotheses in the short term and in the long term has been assumed.
- concerning car pooling a range of 1/2% and 2/3% transfer of potential travel demand for minimum/maximum hypotheses in the short term and in the long term has been assumed;

The basis of the assumptions is explained in section 7.

4.6.8 Through Traffic

In order to obtain a substantial improvement of traffic congestion in the City Centre it is necessary to eliminate the through traffic which represents 66% of City Centre total traffic.

FIGURE 6.1 - POTENTIAL TRAVEL DEMAND - EXISTING DEMAND

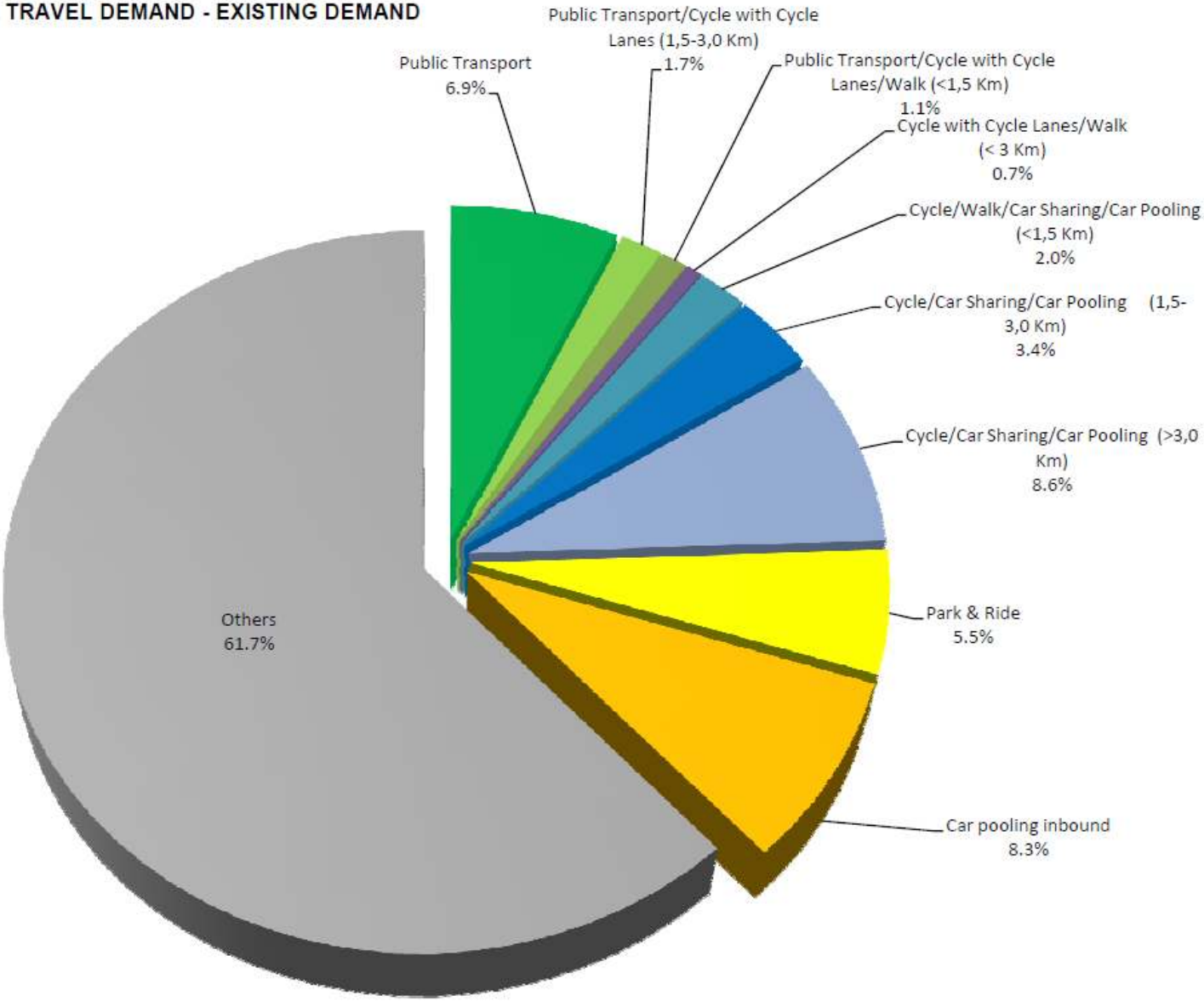
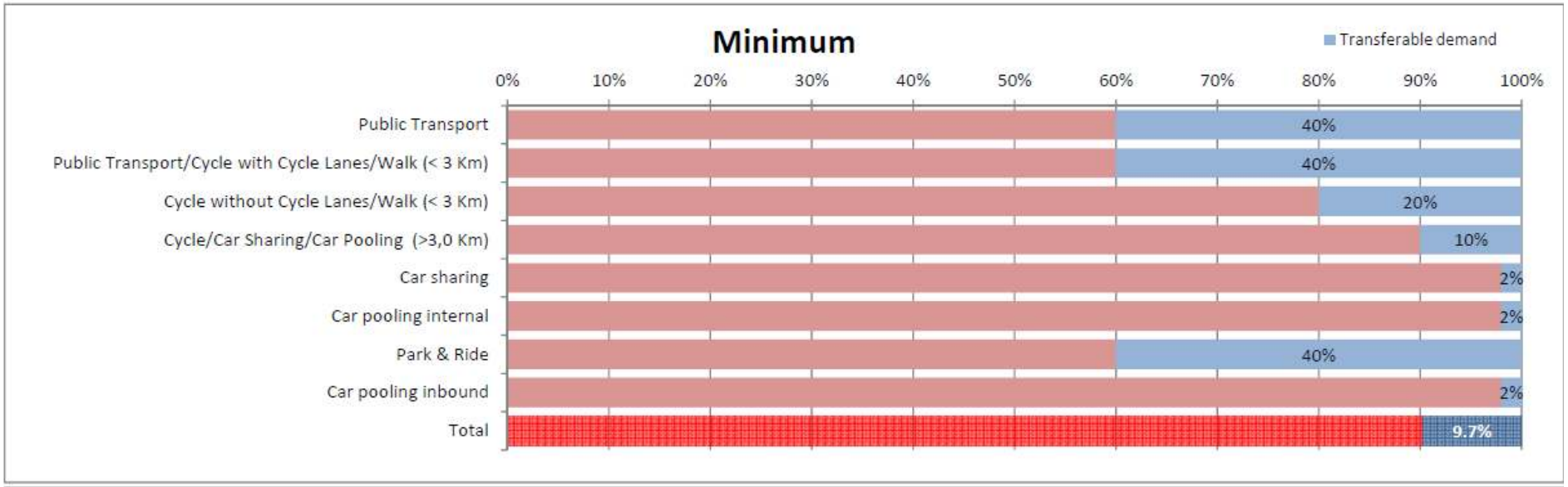


FIGURE 6.2 - MODAL TRANSFER OBJECTIVES - SHORT TERM (2-3 YEARS)

FIGURE 6.3 - MODAL TRANSFER OBJECTIVES - LONG TERM (10 YEARS) 2021



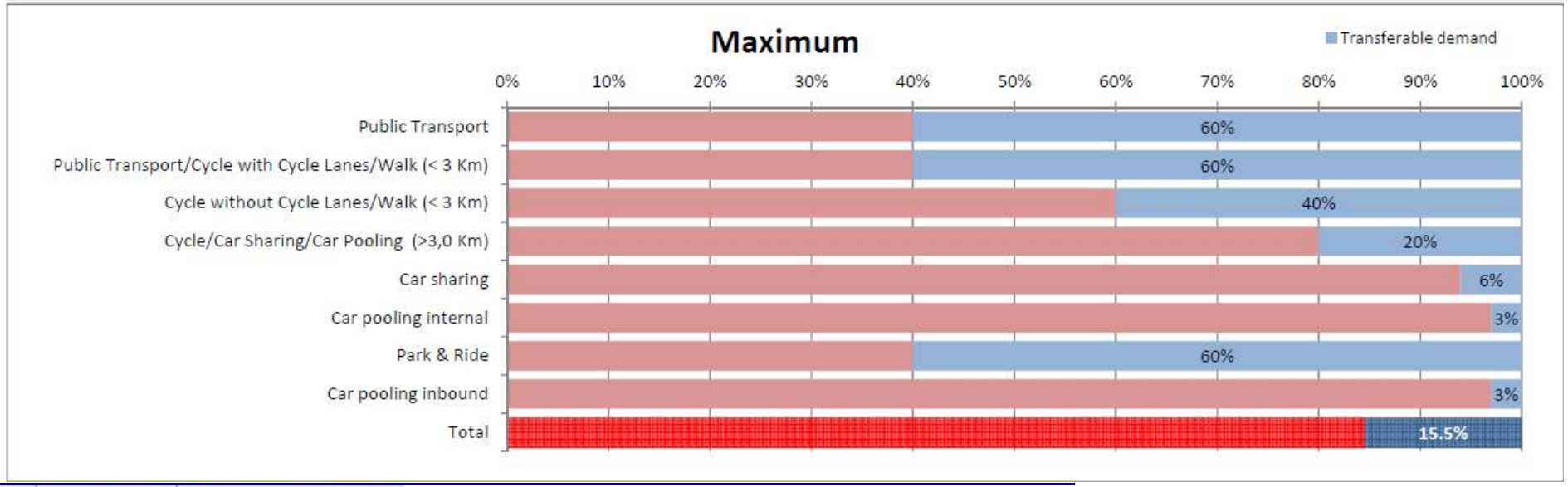
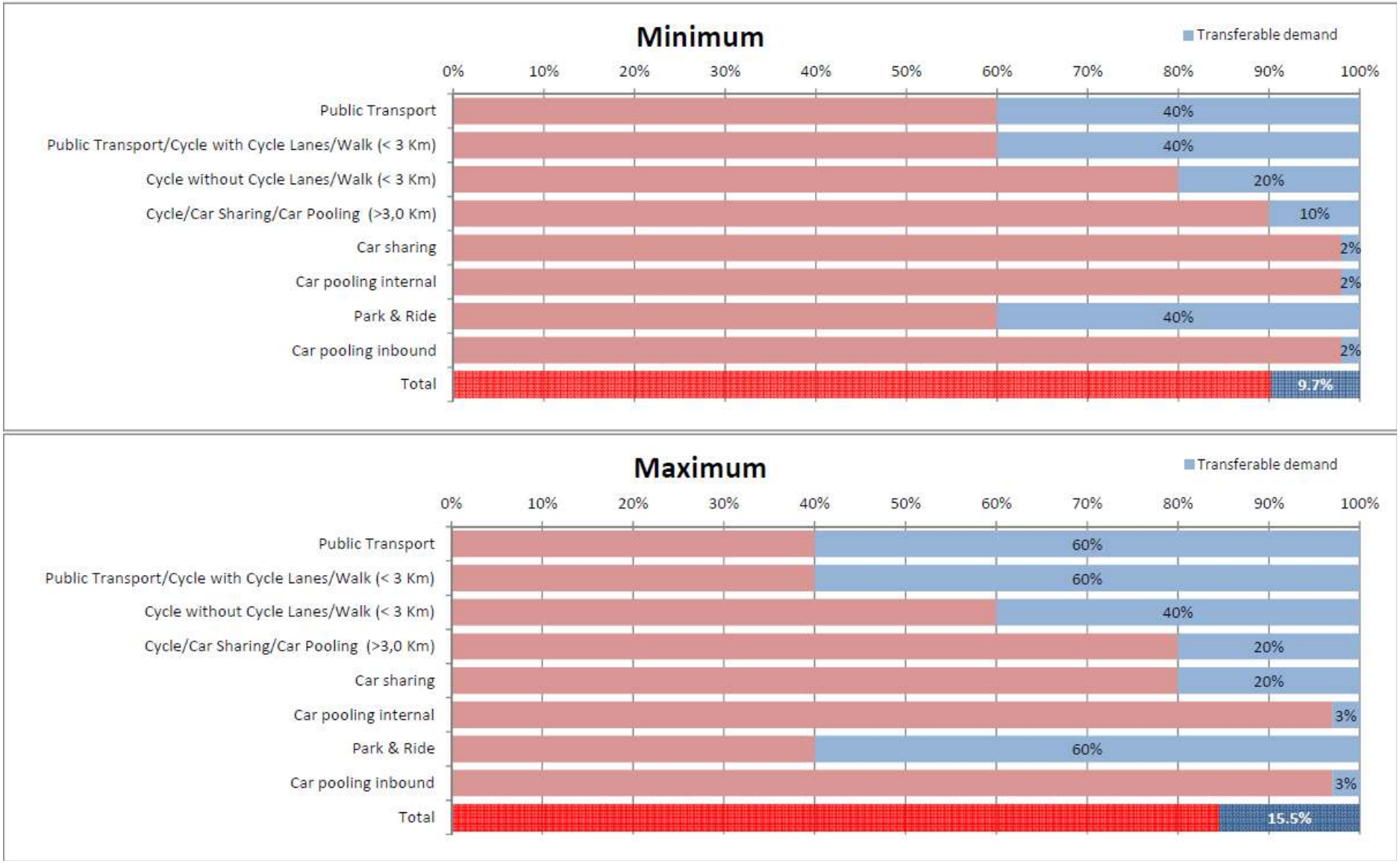


FIGURE 6.4 - MODAL TRANSFER OBJECTIVES - LONG TERM (20 YEARS) 2031



4.7 Feasible Objectives

4.7.1 The Objectives

The primary objectives of Monza Sustainable Urban Transport Plan concern air pollution and energy consumption where European commitments for Kyoto Protocol represent the reference scenario.

In order to achieve these primary objectives it is necessary to reduce road traffic transferring travel demand to other more sustainable transport modes within an expansive land use trend.

4.7.2 Study Methodology

The study methodology described in Chapter 2 of this report is based on an iterative procedure to identify quota of travel demand which may be transferred from private car to more sustainable transport modes.

The identification of the potential travel demand which may be transferred from private car to more sustainable transport modes is necessary to know the potential results which may achieved and then to identify the normative actions which must be adopted to reach the prefixed objectives.

4.7.3 Public Transport Accessibility, Modal Share and Quality of Urban Planning

At present the only high capacity/high quality public transport system in Monza is rail, which provides direct accessibility (maximum 500 metres from the station) to only 4.6% of Monza's total employees and to only 4.4% of Monza's total inhabitants.

The new innovative transport system provides direct accessibility to primary public transport (maximum 300 metres from the stations) to 59.7% of existing employees and to 46.6% of existing inhabitants.

The new settlements proposed by the Urban Plan (PGT) may benefit of high standard accessibility to public transport with 76% of new employees and 73.6% of new inhabitants within walking distance from main public transport network (Figure 7.3.1).

The present day public transport modal share is 13.1% of morning peak hour trips.

Public transport modal share will increase in the short term by 45.2% and by 90.4% in minimum and maximum scenarios of traffic reduction (Figure 7.3.2).

Public transport modal share will increase in the 10 years (2021) by 125.6% and by 188.4% in minimum and maximum scenarios of traffic reduction (Figure 7.3.3).

Public transport modal share will increase in 20 years (2031) by 150.4% and by 225.6% in minimum and maximum scenarios of traffic reduction (Figure 7.3.4).

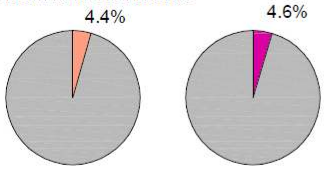
4.7.4 Bike Accessibility and Modal Share

Currently a cycle network doesn't exist while the proposed bike network will serve directly 51.9% of existing employees and 40.9% of existing inhabitants. The proposed bike network will give direct accessibility to more than 60% of new employees and new inhabitants (Figure 7.4.1).

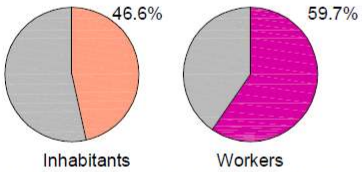
Presently bicycle modal share is 3.6% of morning peak hour trips.

- In the short term bike modal share will increase by 28.1% and by 56.2% in minimum and maximum scenarios of traffic reduction (Figure 7.3.2).
- In 2021 bike modal share will increase by 49.1% and 90.7% in minimum and in maximum scenarios of modal share (Figure 7.3.3).
- In 2031 bike modal share will increase by 60.6% and 111.3% in minimum and maximum scenarios of traffic reduction (Figure 7.3.4).

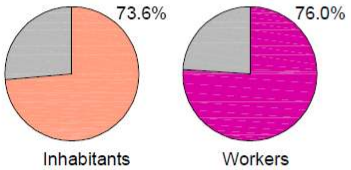
INHABITANTS/WORKERS/HIGH CAPACITY-HIGH QUALITY PUBLIC TRANSPORT AT WALKING DISTANCE FROM RAIL NETWORK



CURRENT DEMAND OF TRANSPORTS



LONG TERM SCENARIO CURRENT DEMAND



NEW DEMAND

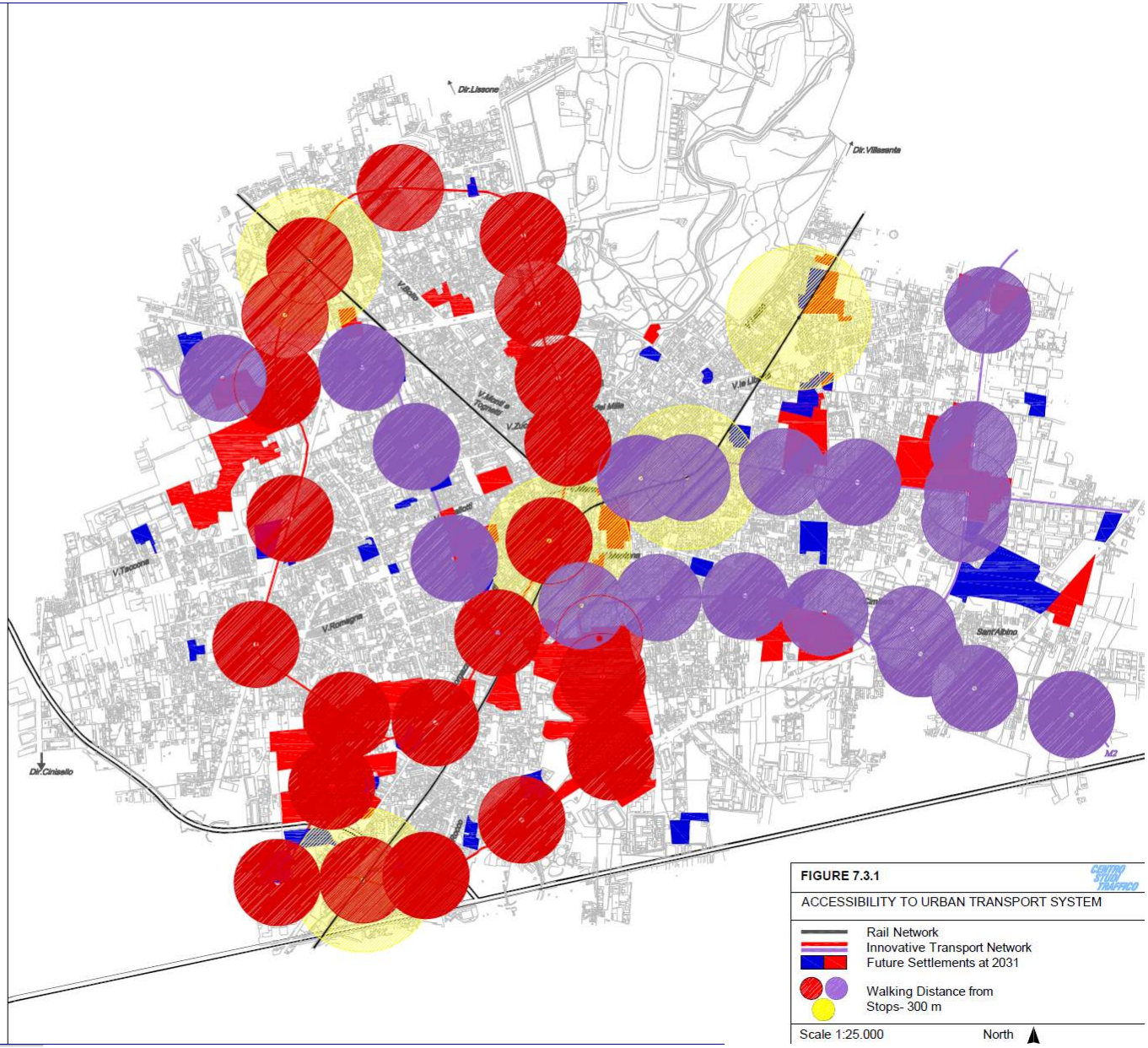


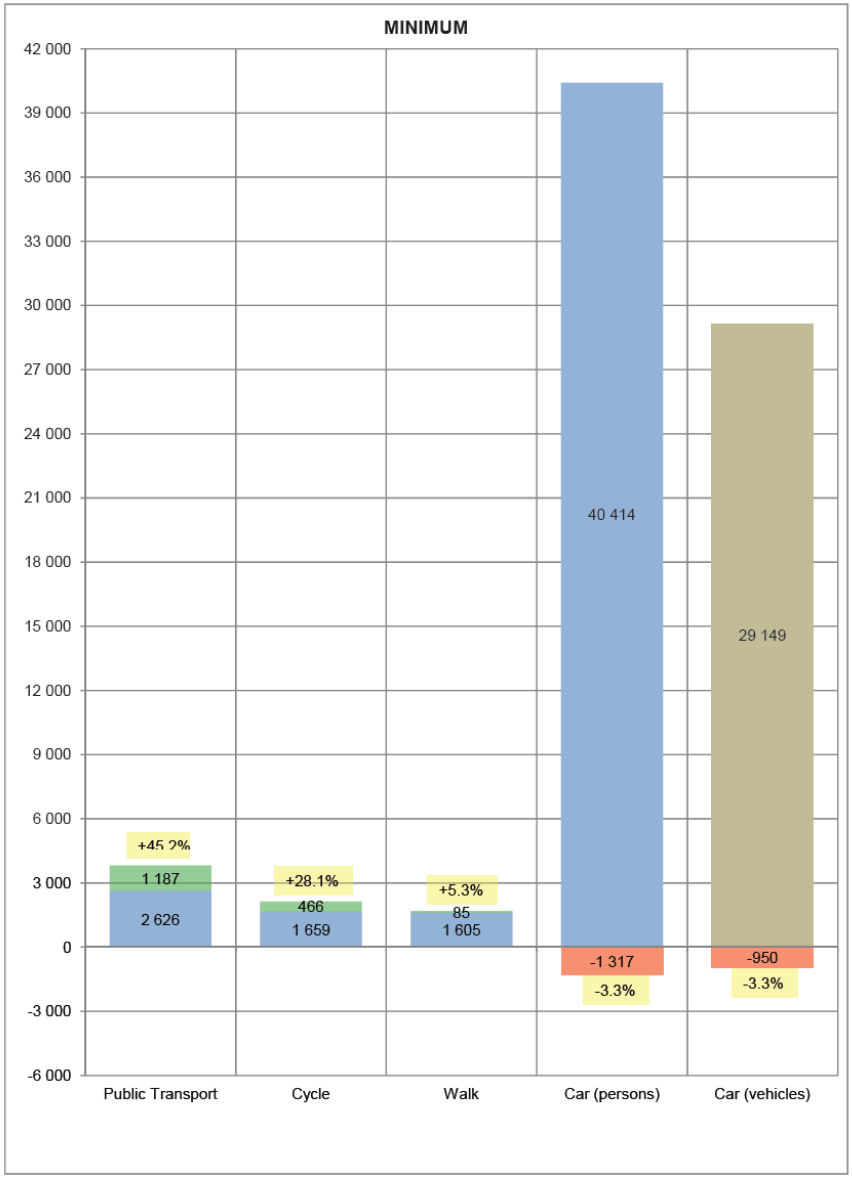
FIGURE 7.3.1

ACCESSIBILITY TO URBAN TRANSPORT SYSTEM

Rail Network
Innovative Transport Network
Future Settlements at 2031
Walking Distance from Stops- 300 m

Scale 1:25.000 North

FIGURE 7.3.2 - SHORT TERM SCENARIO (TRIPS MORNING PEAK HOUR) - MODAL TRANSFER



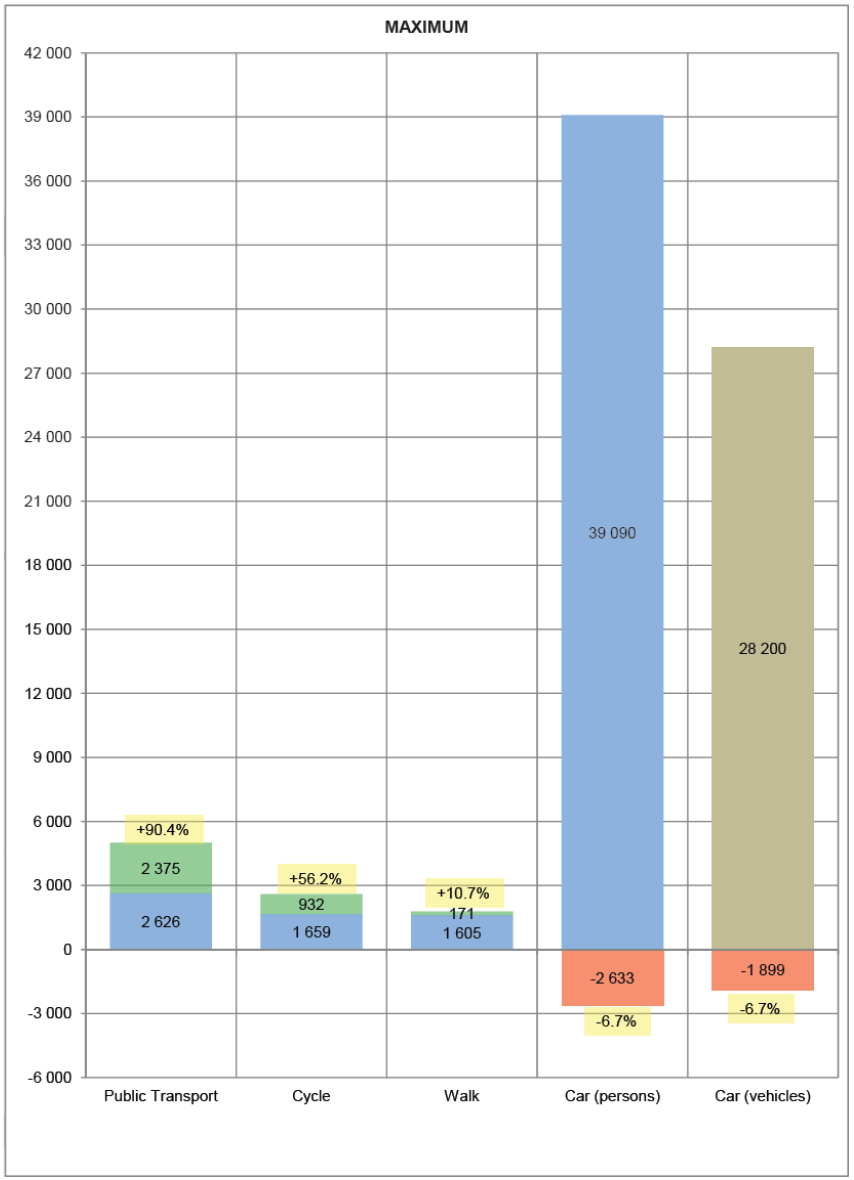
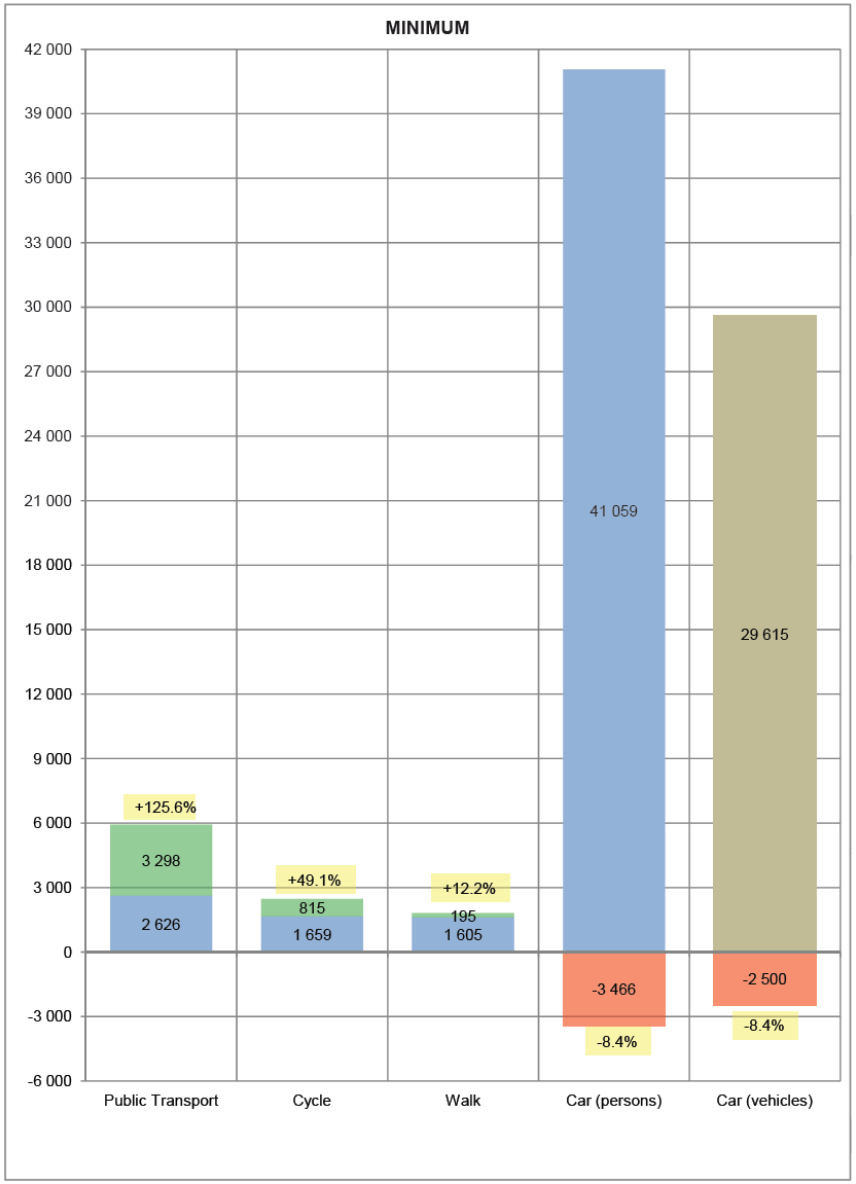


FIGURE 7.3.3 - LONG TERM SCENARIO 2021 (TRIPS MORNING PEAK HOUR) - MODAL TRANSFER



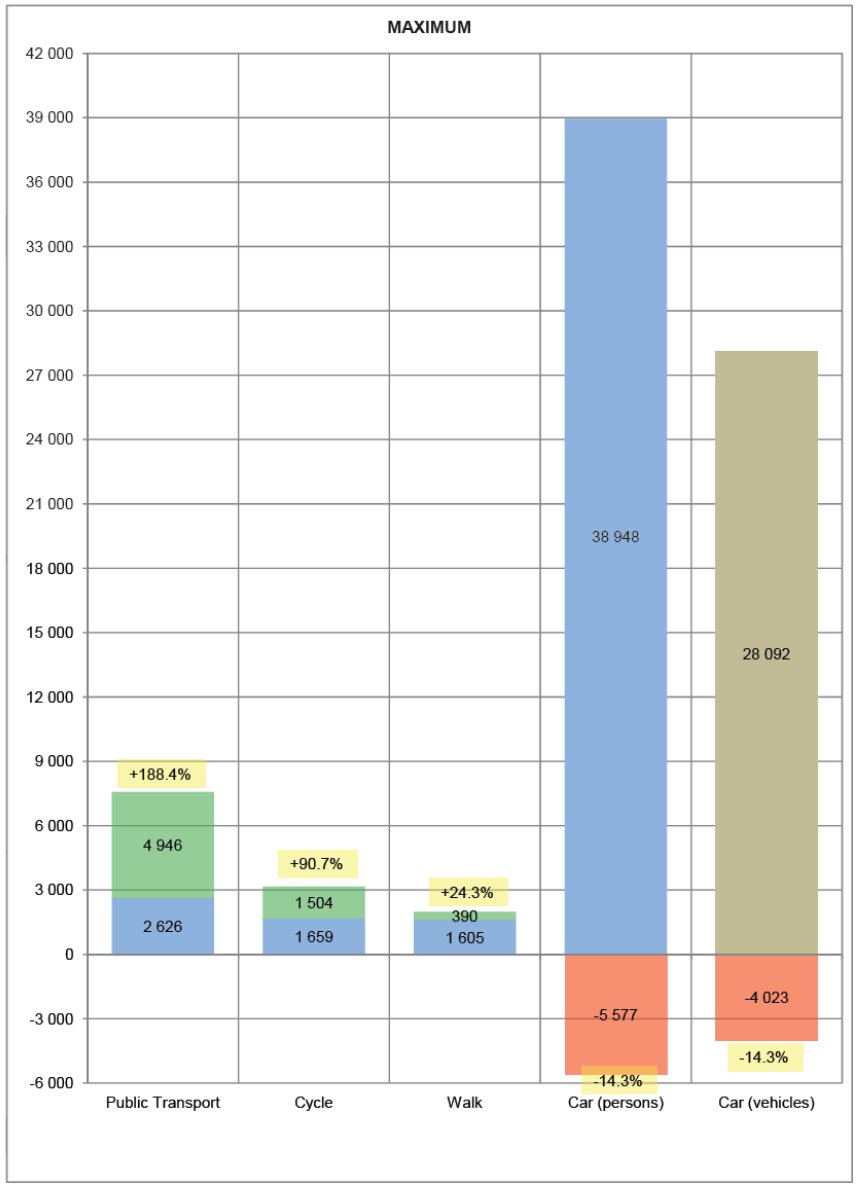
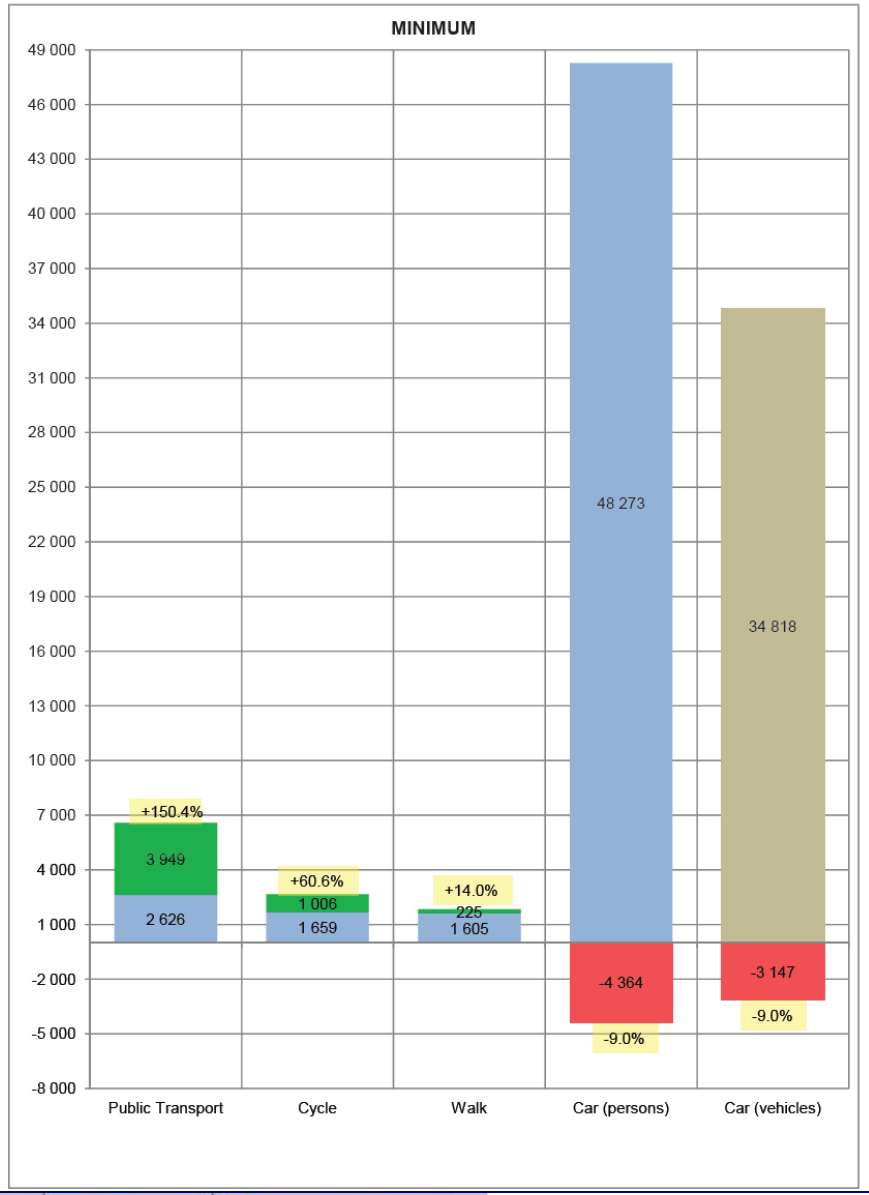
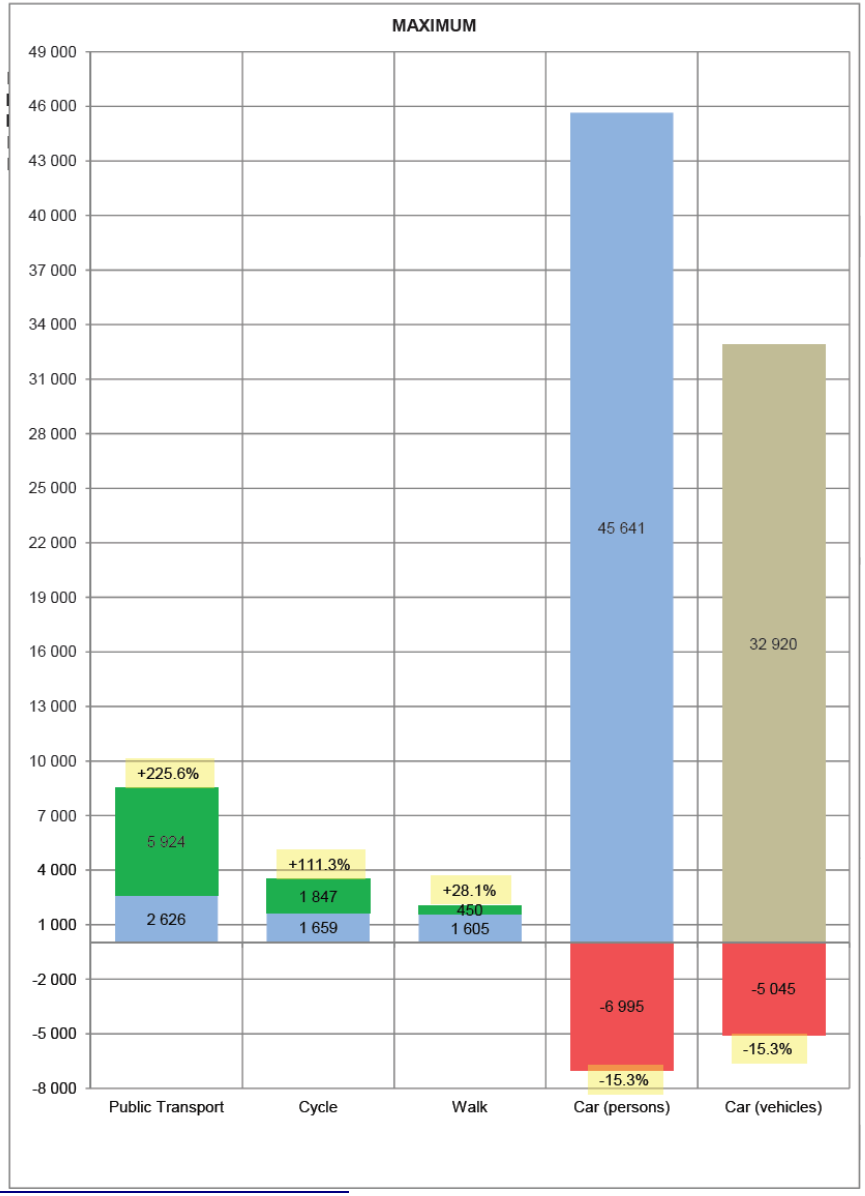
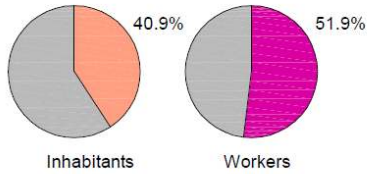


FIGURE 7.3.4 - LONG TERM SCENARIO 2031 (TRIPS MORNING PEAK HOUR) - MODAL TRANSFER

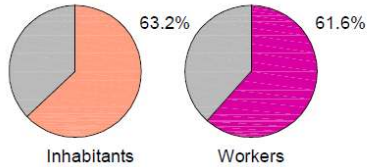




INHABITANTS/ WORKERS AT WALKING DISTANCE FROM BIKE NETWORK



CURRENT DEMAND



NEW DEMAND

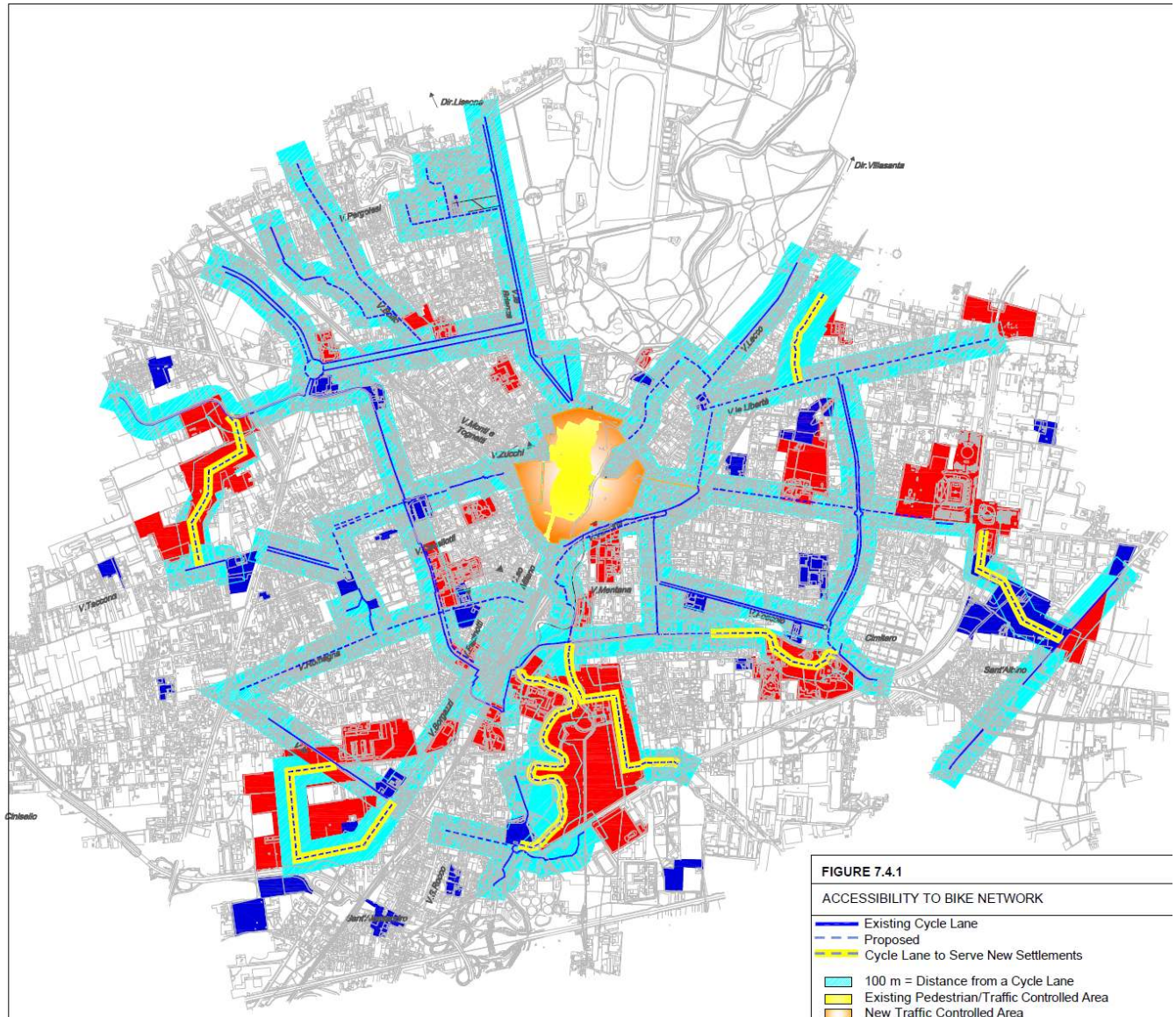


FIGURE 7.4.1

ACCESSIBILITY TO BIKE NETWORK

- Existing Cycle Lane
- Proposed
- Cycle Lane to Serve New Settlements
- 100 m = Distance from a Cycle Lane
- Existing Pedestrian/Traffic Controlled Area
- New Traffic Controlled Area
- New Pedestrian Area

Scale 1: 25.000 North

4.7.5 Other Innovative Transport Modes Modal Share

Electric car sharing may have in the short term a modal split of 0.04% and 0.14% in minimum and maximum scenarios of traffic reduction: these values may increase to 0.07% and 0.21% in 2021 and to 0.07% and 0.72% in 2031 in minimum and in maximum scenarios of traffic reduction (Tables 7.5.1-7.5.3).

Car pooling may have in the short term a modal split of 0.1% and 0.21% in minimum and maximum scenarios of traffic reduction: these values may increase to 0.2% and 0.3% in 2021 and to 0.22% and 0.34% in 2031 in minimum and in maximum scenarios of traffic reduction (Tables 7.5.1-7.5.3).

4.7.6 Traffic Reduction

In the short term (2-3 years) existing traffic may be reduced by 4.3% and by 8.7% in minimum and maximum scenarios: these values represent a reduction of 2.6% and of 5.2% in terms of vehicle-kms (Table 7.5.1).

Long term infrastructures scenarios may achieve a reduction of 9.7% and of 15.5% without travel demand generated by new settlements in minimum and maximum scenarios: these values represent a reduction of 6.5% and 10.2% in terms of vehicle-kms (Table 7.5.2).

Taking into account travel demand generated by new settlements (+ 6.7% in 2021 and +26.1% in 2031), 2021 traffic will be -3.9% and -10.2% of existing traffic and 2031 traffic will be +13.3% and +5.1% of existing traffic in minimum and maximum scenarios: these values represent variations expressed in vehicle-kms of -0.7% and -4.8% in 2021 and of +16.1% and +10.6% in 2031 (Tables 7.5.3a/b).

TABLE 7.5.1 - TRAFFIC REDUCTION PEAK HOUR 7.45-8.45 - SHORT TERM SCENARIO (2-3 YEARS)

N°CARS		transferable to		%	%	MIN	MAX	N°CARS MIN	N°CARS MAX	Km	Vehic-Km MIN	Vehic-Km MAX
	2,086	Public Transport		6.9%		20%	40%	417	834	4.05	1,690	3,379
	524	Public Transport/Cycle with Cycle Lanes (1,5-3,0 Km		1.7%		20%	40%	105	210	2.25	236	472
	323	Public Transport/Cycle with Cycle Lanes/Walk (<1,5		1.1%		20%	40%	65	129	0.81	52	105
	196	Cycle with Cycle Lanes/Walk (< 3 Km)		0.7%		20%	40%	39	78	1.95	76	153
	614	Cycle/Walk/Car sharing/Car Pooling (<1,5 Km)		2.0%		10%	20%	61	123	0.85	52	104
11,519	1,024	Cycle/Car sharing/Car Pooling (1,5-3,0 Km)		3.4%	38%	10%	20%	102	205	2.51	257	514
	2,581	Cycle/Car sharing/Car Pooling (>3,0 Km)		8.6%		5%	10%	129	258	4.31	556	1,112
	1,054	Electric car sharing	3.5%			1%	4%	11	42	4.10	43	173
	594	Car pooling internal	2.0%			1%	2%	6	12	4.12	24	49
	1,661	Park & Ride		5.5%		20%	40%	332	664	2.10	698	1,395
	2,510	Car pooling inbound		8.3%		1%	2%	25	50	7.20	181	361
	18,580	Not transferable		62%								
		Transferable				4.3%	8.7%	**1,292**	**2,606**		**3,865**	**7,817**
	30,099	Total		100%						5.01	**150,944**	**150,944**
									Change from current traffic		**-2.6%**	**-5.2%**

	MIN	MAX
Electric car sharing transfer %	0.04%	0.14%
Car pooling transfer %	0.10%	0.21%

TABLE 7.5.2 - TRAFFIC REDUCTION PEAK HOUR 7.45-8.45 - LONG TERM WITHOUT NEW TRAFFIC SCENARIO (10-20 YEARS)

N°CARS		transferable to		%	%	MIN	MAX	N°CARS MIN	N°CARS MAX	Km	Vehic-Km MIN	Vehic-Km MAX
	3,278	Public Transport		10.9%		40%	60%	1311	1967	4.58	6,003	9,005
	633	Public Transport/Cycle with Cycle Lanes (1,5-3,0 Km)		2.1%		40%	60%	253	380	2.25	570	855
	355	Public Transport/Cycle with Cycle Lanes/Walk (<1,5 K		1.2%		40%	60%	142	213	0.81	115	172
	55	Cycle with Cycle Lanes/Walk (< 3 Km)		0.2%		40%	60%	22	33	1.95	43	65
	594	Cycle/Walk/Car sharing/Car Pooling (<1,5 Km)		2.0%		20%	40%	119	238	0.85	101	201
11,519	969	Cycle/Car sharing/Car Pooling (1,5-3,0 Km)		3.2%	38%	20%	40%	194	388	2.51	487	973
	1,464	Cycle/Car sharing/Car Pooling (>3,0 Km)		4.9%		10%	20%	146	293	4.31	631	1,262
	976	Electric car sharing	3.2%			2%	6%	20	59	3.98	78	233
	547	Car pooling internal	1.8%			2%	3%	11	16	3.92	43	64
	1,661	Park & Ride		5.5%		40%	60%	664	997	2.10	1,395	2,093
	2,510	Car pooling inbound		8.3%		2%	3%	50	75	7.20	361	542
	18,580	Not transferable		61.7%								
		Transferable				9.7%	15.5%	**2,932**	**4,657**		**9,826**	**15,465**
	30,099	Total		100%						5.01	**150,944**	**150,944**
							Change from current traffic				**-6.5%**	**-10.2%**

	MIN	MAX
Electric car sharing transfer %	0.06%	0.19%
Car pooling transfer %	0.20%	0.30%

TABLE 7.5.3a - TRAFFIC CHANGES PEAK HOUR 7.45-8.45 - IN NEW LAND USE SCENARIOS - LONG TERM 2021 (10 YEARS)

N°CARS		transferable to		%	%	MIN	MAX	N°CARS MIN	N°CARS MAX	Km	Vehic-Km MIN	Vehic-Km MAX
	3,545	Public Transport		11.0%		40%	60%	1418	2127	4.55	6,456	9,684
	725	Public Transport/Cycle with Cycle Lanes (1,5-3,0 Km)		2.3%		40%	60%	290	435	2.245	651	976
	378	Public Transport/Cycle with Cycle Lanes/Walk (<1,5 K		1.2%		40%	60%	151	227	0.807	122	183
	77	Cycle with Cycle Lanes/Walk (< 3 Km)		0.2%		40%	60%	31	46	1.948	60	90
	702	Cycle/Walk/Car sharing/Car Pooling (<1,5 Km)		2.2%		20%	40%	140	281	0.862	121	243
12,606	1,189	Cycle/Car sharing/Car Pooling (1,5-3,0 Km)		3.7%	39.3%	20%	40%	238	476	2.498	594	1,189
	1,668	Cycle/Car sharing/Car Pooling (>3,0 Km)		5.2%		10%	20%	167	334	4.323	721	1,442
	1,109	Electric car sharing	3.5%			2%	6%	22	67	3.92	87	260
	593	Car pooling internal	1.8%			2%	3%	12	18	3.88	46	69
	1,661	Park & Ride		5.2%		40%	60%	664	997	2.10	1,395	2,093
	2,661	Car pooling inbound		8.3%		2%	3%	53	80	7.14	380	569
	19,509	Not transferable		60.7%								
		Transferable				9.9%	15.8%	**3,187**	**5,086**		**10,633**	**16,798**
		Δ% from current number car trips				-3.9%	-10.2%					
	32,115	Total		100%						5.00	**160,504**	**160,504**

Change from future traffic at current modal split	**-6.6%**	**-10.5%**
Change from current traffic	**-0.7%**	**-4.8%**

	MIN	MAX
Electric car sharing transfer %	0.07%	0.21%
Car pooling transfer %	0.20%	0.30%

TABLE 7.5.3b - TRAFFIC CHANGES PEAK HOUR 7.45-8.45 - IN NEW LAND USE SCENARIOS - LONG TERM 2031 (20 YEARS)

N°CARS		transferable to		%	%	MIN	MAX	N°CARS MIN	N°CARS MAX	Km	Vehic-Km MIN	Vehic-Km MAX
	4,444	Public Transport		11.7%		40%	60%	1778	2666	4.58	8,148	12,222
	998	Public Transport/Cycle with Cycle Lanes (1,5-3,0 Km)		2.6%		40%	60%	399	599	2.29	913	1,369
	494	Public Transport/Cycle with Cycle Lanes/Walk (<1,5 K		1.3%		40%	60%	197	296	0.81	159	239
	100	Cycle with Cycle Lanes/Walk (< 3 Km)		0.3%		40%	60%	40	60	1.95	78	118
	810	Cycle/Walk/Car sharing/Car Pooling (<1,5 Km)		2.1%		20%	40%	162	324	0.87	141	283
15,426	1,367	Cycle/Car sharing/Car Pooling (1,5-3,0 Km)		3.6%	41%	20%	40%	273	547	2.51	687	1,375
	2,128	Cycle/Car sharing/Car Pooling (>3,0 Km)		5.6%		10%	20%	213	426	4.31	917	1,833
	1,375	Eletric car sharing	3.6%			2%	20%	28	275	3.79	104	1,042
	817	Car pooling internal	2.2%			2%	3%	16	25	3.61	59	89
	1,661	Park & Ride		4.4%		40%	60%	664	997	2.10	1,395	2,093
	3,424	Car pooling inbound		9.0%		2%	3%	68	103	6.90	472	709
	22,530	Not transferable		59.4%								
		Transferable				10.1%	16.6%	**3,839**	**6,317**		**13,074**	**21,370**
		Δ% from current number car trips				13.3%	5.1%					
	37,956	Total		100%						4.96	**188 324**	**188,324**

Change from future traffic at current modal split	**-6.9%**	**-11.3%**
Change from current traffic	**+16.1%**	**+10.6%**

	MIN	MAX
Electric car sharing transfer %	0.07%	0.72%
Car pooling transfer %	0.22%	0.34%

4.7.7 Congestion Reduction

Traffic congestion reduction may be obtained with the reduction of traffic in most congested roads and with capacity improvements of the most critical nodes.

Congestion is expressed in average speed for each link of Monza road network.

In the SUTP feasible objectives are considered to be reductions of 5-10% of congestion in the short term (2-3 years) and reductions of 10-20% in the long term (2021-2031) with an overall increase of the traffic demand.

It is important to remember that a reduction of x% of congestion may give a reduction of x/2% of CO_2 emissions.

4.7.8 Atmospheric Pollution and Energy Consumption Reduction

Following European commitments for Kyoto Protocol Monza SUTP aims to reduce CO_2 traffic emission and energy consumption by 20% by 2021 and by 30% by 2031.

CO_2 emission and energy consumption depend on total car traffic demand (existing and generated by new settlements) expressed in vehicle-kms, on congestion and on vehicles technological improvement (CO_2 emission end energy consumption per vehicle-km).

In the short term (2-3 years) with the existing vehicle technology and with the existing travel demand the reduction of CO_2 and of energy consumption varies between 6.9% and 11.7% depending on minimum or maximum scenario of traffic and congestion reduction (Table 7.8.1).

In 2021 scenario, taking into account vehicle technological improvement and travel demand generated by new settlement, CO_2 and energy consumption reduction varies between 20% and 30%, close to European commitments depending on minimum or maximum scenario of traffic and congestion reduction (Table 7.8.1).

In 2031 scenario, when travel demand will increase of 26.1% it is possible to identify the vehicle technological improvement necessary to reach European commitments of 30% CO_2 reduction with 36.5% CO_2 reduction due to vehicle improvement (against an expected improvement of 15% by 2020) in minimum scenario of traffic and congestion reduction, and with 30% reduction due to vehicle improvement in maximum scenario. At the present there are no normative indications which enable to forecast 2031 vehicle CO_2 emission and energy consumption; however existing trends of vehicles improvements indicate that these objectives may be reached (Table 7.8.1).

TABLE 7.8.1 - AIR POLLUTION FEASIBLE REDUCTION

SHORT TERM (2-3 years)

						Δ CO2			
Scenario	Δ existing car traffic demand	Δ existing vehic-Km	Δ new traffic demand vehic-Km	Δ Total vehic-Km	Δ congestion	vehicle improvements	congestion	vehic-Km	**Total**
Minimum	-4.3%	-2.6%	0.0%	-2.6%	-5.0%	-2.0%	-2.5%	-2.6%	**-6.9%**
Maximum	-8.7%	-5.2%	0.0%	-5.2%	-10.0%	-2.0%	-5.0%	-5.2%	**-11.7%**

LONG TERM (10 years)

						Δ CO2			
Scenario	Δ existing car traffic demand	Δ existing vehic-Km	Δ new traffic demand vehic-Km	Δ Total vehic-Km	Δ congestion	vehicle improvements	congestion	vehic-Km	**Total**
Minimum	-9.7%	-6.5%	5.8%	-0.7%	-10.0%	-15.0%	-5.0%	-0.7%	**-19.8%**
Maximum	-15.5%	-10.2%	5.5%	-4.8%	-20.0%	-15.0%	-10.0%	-4.8%	**-27.2%**

LONG TERM (20 years)

						Δ CO2			
Scenario	Δ existing car traffic demand	Δ existing vehic-Km	Δ new traffic demand vehic-Km	Δ Total vehic-Km	Δ congestion	vehicle improvements	congestion	vehic-Km	**Total**
Minimum	-9.7%	-6.5%	22.6%	16.1%	-10.0%	-36.5%	-5.0%	16.1%	**-30.0%**
Maximum	-15.5%	-10.2%	21.3%	11.1%	-20.0%	-30.0%	-10.0%	11.1%	**-30.0%**

4.7.9 Atmospheric Pollution and Energy Consumption Reduction

Specific objective of Monza SUTP is noise reduction of 5dB(A) of the most critical urban areas where traffic is the main cause of noise. 5 dB(A) reduction means class change in noise zoning.

Noise Limits [LAeq in dB(A)]

LAND USE CLASS	DAY (6.00-22.00)	NIGHT (22.00-6.00)
I HIGH PROTECTION	50	40
II MAINLY RESIDENTIAL	55	45
III MIXED ACTIVITIES	60	50
IV INTENSE HUMAN ACTIVITIES	65	55
V MAINLY INDUSTRIAL	70	60
VI ONLY INDUSTRIAL	70	70

This objective may be reached through the following actions:

- traffic reduction;
- speed limits;
- prohibition of heavy vehicles;
- innovative public transport means with minimum noise impact;
- buses technological improvement;
- phonoabsorbent asphalts.

4.7.10 Accident Reduction

Other specific objective of Monza SUTP is a 50% reduction of roads victims by 2021.

This objective may be reached through the following actions:

- speed limits (30 Km/hr) in most critical area;
- bike users protection;
- sidewalk widening and pedestrians crossings protection;
- most dangerous situations monitoring and solutions implementation.

Actions will become part of a specific Road Safety Plan with a constant monitoring of the results and of the effectiveness of the adopted solutions.

4.8 Feasible Objectives Against Prefixed Objectives

Feasible objectives are compared with prefixed objectives (Figure 8.1): it is interesting to notice that, despites the increase of travel demand due to expansive urban planning, the proposed public transport system and cycle network are able to attract important car travel demand so that air pollution and energy consumption reduction prefixed objectives, required by Kyoto Protocol, may be reached in the short term and in 2020 through a private traffic control policy. In the short term, without new infrastructures in favour of public transport, the prefixed objective of 10% CO_2 reduction may be reached only in the hypothesis of maximum modal transfer from private car while in 2020 the prefixed objective of 20% CO_2 reduction may be reached also in the minimum hypothesis of modal transfer.

In 2030, the very high increase of travel demand generated by new settlements requires a significant improvement of vehicle performances in terms of CO_2 emissions (30-36.5% reductions against 15% reduction expected in 2020).

FIGURE 8.1 - PREFIXED OBJECTIVES AND FEASIBLE OBJECTIVES

INDICATOR	TREND	PREFIXED OBJECTIVES			FEASIBLE OBJECTIVES		
		2-3 YEARS	2020	2030	2-3 YEARS	2020	2030
AIR POLLUTION CO2 (Transport Emissions)	INCREASE	-10%	-20%	-30%	-6,9%/-11,7%	-19,8%/-27,2%	-30%/-30%
ENERGY CONSUMPTION	INCREASE	-10%	-20%	-30%	-6,9%/-11,7%	-19,8%/-27,2%	-30%/-30%
NOISE Noise Level dB(A)	INCREASE	-5 dB(A)	-5 dB(A)	-5 dB(A)	-5 dB(A)	-5 dB(A)	-5 dB(A)
TRAFFIC Veic.-Km	INCREASE	-5%	-15%	-15%	-2,6%/-5,2%	-0,7%/-4,8%	+16,1%/+10.6%
CONGESTION	INCREASE	-10%	-20%	-20%	-5%/-10%	-10%/-20%	-10%/-20%
ROAD SAFETY n. of victimes	DECREASE	-20%	-50%		-20%	-50%	
PUBLIC TRANSPORT Modal split	DECREASE	INCREASE	INCREASE	INCREASE	+45,2%/+90,4% (passengers)	+125,6%/+188,4 % (passengers)	+150,4%/+225,6 % (passengers)
CYCLISTS Modal split	STABLE	INCREASE	INCREASE	INCREASE	+28,1%/+56,2% (passengers)	+49,1%/+90,7% (passengers)	+60,6%/+111,3% (passengers)
PEDESTRIANS Modal split	STABLE	INCREASE	INCREASE	INCREASE	+5,3%/+10,7% (people)	+12,2%+24,3% (people)	+14,0%/+28,1% (people)
ELECTRIC CAR SHARING Modal split		ENCOURAGE USE	ENCOURAGE USE	ENCOURAGE USE	0,04%/0,14% (modal split)	0.07%/0,21% (modal split)	0,07%/0,72% (modal split)
CAR POOLING Modal split		ENCOURAGE USE	ENCOURAGE USE	ENCOURAGE USE	0,10%/0,21% (modal split)	0,2%/0,3% (modal split)	0,22%/0,34% (modal split)

4.9 Action Plan and Economic Plan

4.9.1 Short Term

In the short term Monza Municipality with the Project CIVITAS ARCHIMEDES is undertaking a series of measures in favour of more sustainable transport modes.

These measures include:

- Measure No. 7 Hybrid Bus in Monza
  The objective is to procure and operate a hybrid bus in Monza.

- Measure No. 19 Demand Responsive Public Transport Connections in Monza
  The objective is to improve the quality of public transports.
  The measure is the implementation of a Demand Responsive service for low demand areas and for evening services.

- Measure No. 61 Car Sharing Schemes Improvements in Monza
  The objective is the development of new form of vehicle ownership and energy-efficient modes.
  The measure includes a research to increase the awareness of new forms of car ownership and to promote the diffusion of car sharing in Monza.

- Measure No. 62 Cycle Transport Improvements in Monza
  The objective is the promotion of new form of vehicles ownership and energy-efficient modes.
  The measure includes the implementation of improvements of cycle facilities to encourage the use of bicycles as form of transport.

- Measure No 78 Bus Management System in Monza
  The objective is to increase the service level of urban public transport.
  The measure includes a study to define the requirements for interfacing the AVL/AVM system already used by local bus company TPM with the bus traveller information system and with the traffic lights system to give priority to public transport.

- Measure No 79 Improved Traveller Information System in Monza
  The objective is to set up a Real Time Information System for urban public transport.
  The measure includes a study to define the requirements of the kind of information to be provided to passengers at key interchanges and key bus stops in Monza.

- Measure No. 80 Park&Ride Parking Guidance System in Monza
  The objective is to design and implement a real time parking guidance system that will inform drivers about the occupancy rates of the most relevant car parks in the City of Monza.

- Measure No. 81 UTC System in Monza
  The objective is to design and implement an Urban Transport Control system to maximize traffic lights intersections capacity.

- Measure No. 82 Public Transport Priority System in Monza
  The objective is the updating of the bus priority system integrated with the new Urban Traffic Control system.

For these projects are available 812,000 Euros.

It is obvious that these important measures are mainly demonstrative and at test volumes are not able to transfer significant travel demand from private cars to more sustainable transport modes.

In order to achieve the short term SUTP objectives Monza Municipality has defined the new Urban Traffic Plan which includes these main actions:

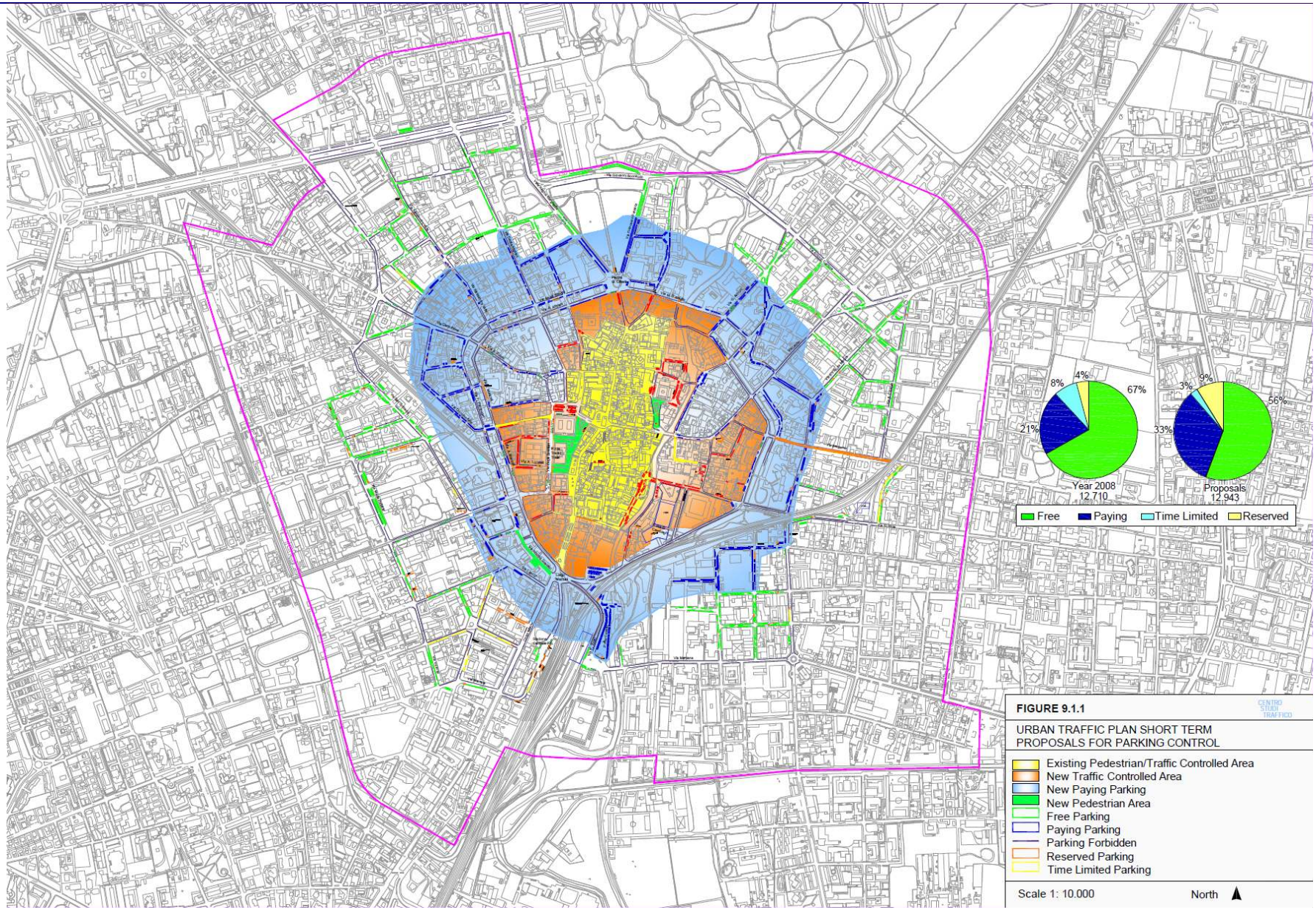
- a new parking control with extension of paying spaces (Figure 9.1.1);
- a new electric minibus free of charge service with interchange parking (Figure 9.1.2);
- a cycle ways network (Figure 9.1.3);
- a very wide traffic controlled area in the City Centre (Figure 9.1.4);
- safety actions on all Municipality kerbsides (standardisation of all kerbsides: to minimum width of 1.5 m) (Figure 9.1.5).

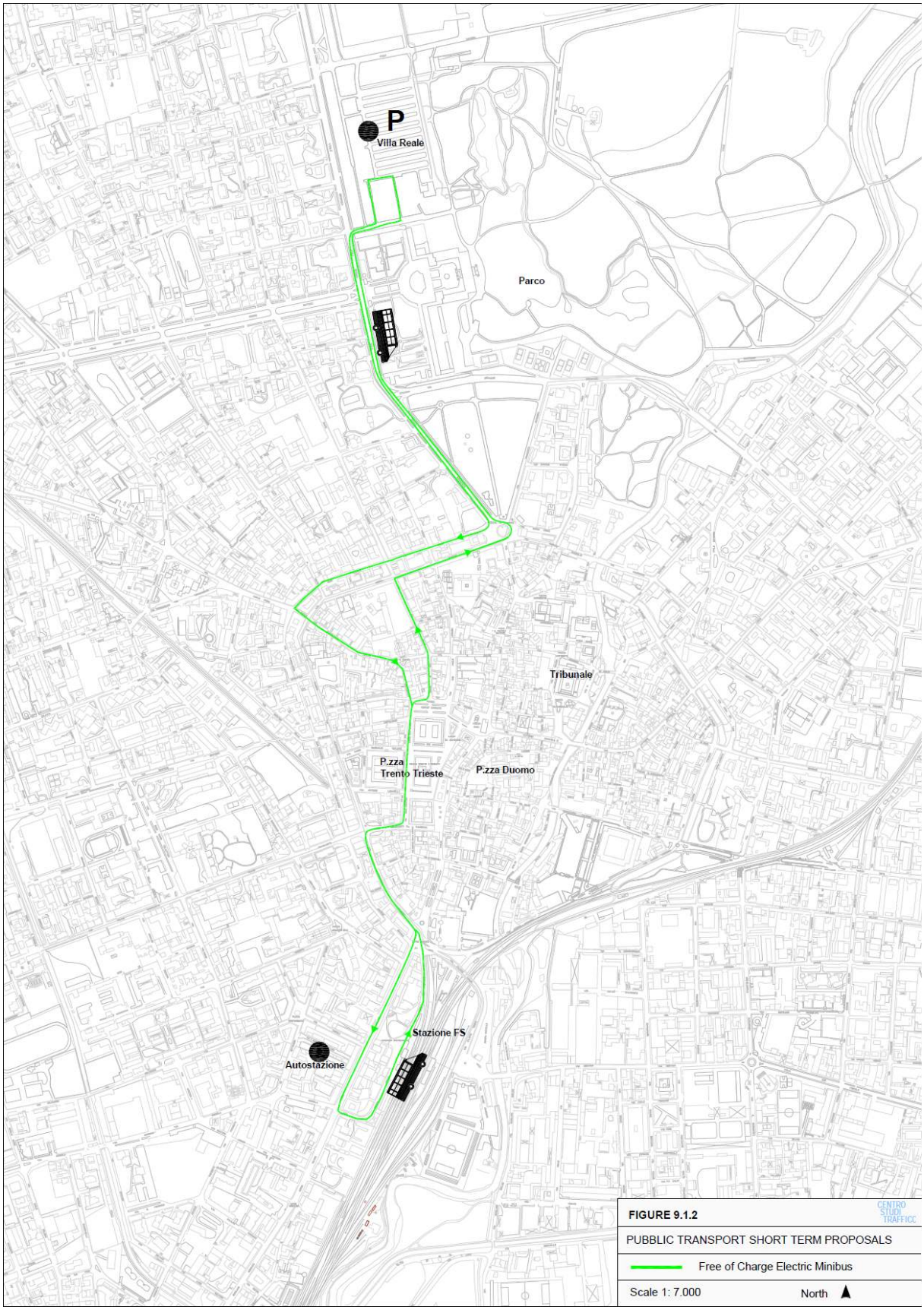
In order to reduce noise the following additional short term actions may be undertaken:

- speed limits;
- prohibition of heavy vehicles;
- phonoabsorbent asphalts.

In order to reduce accidents the following additional short term actions may be undertaken:

- speed limits;
- safety projects for the most dangerous situations.


8%
4%
67%
21%
Year 2008
12.710
3%
9%
56%
33%
Proposals
12.943
Free
Paying
Time Limited
Reserved
FIGURE 9.1.1
URBAN TRAFFIC PLAN SHORT TERM
PROPOSALS FOR PARKING CONTROL
Existing Pedestrian/Traffic Controlled Area
New Traffic Controlled Area
New Paying Parking
New Pedestrian Area
Free Parking
Paying Parking
Parking Forbidden
Reserved Parking
Time Limited Parking
Scale 1: 10.000
North


P
Villa Reale
Parco
Tribunale
P.zza
Trento Trieste
P.zza Duomo
Stazione FS
Autostazione
FIGURE 9.1.2
CENTRO STUDI TRAFFICO
PUBBLIC TRANSPORT SHORT TERM PROPOSALS
Free of Charge Electric Minibus
Scale 1: 7.000
North

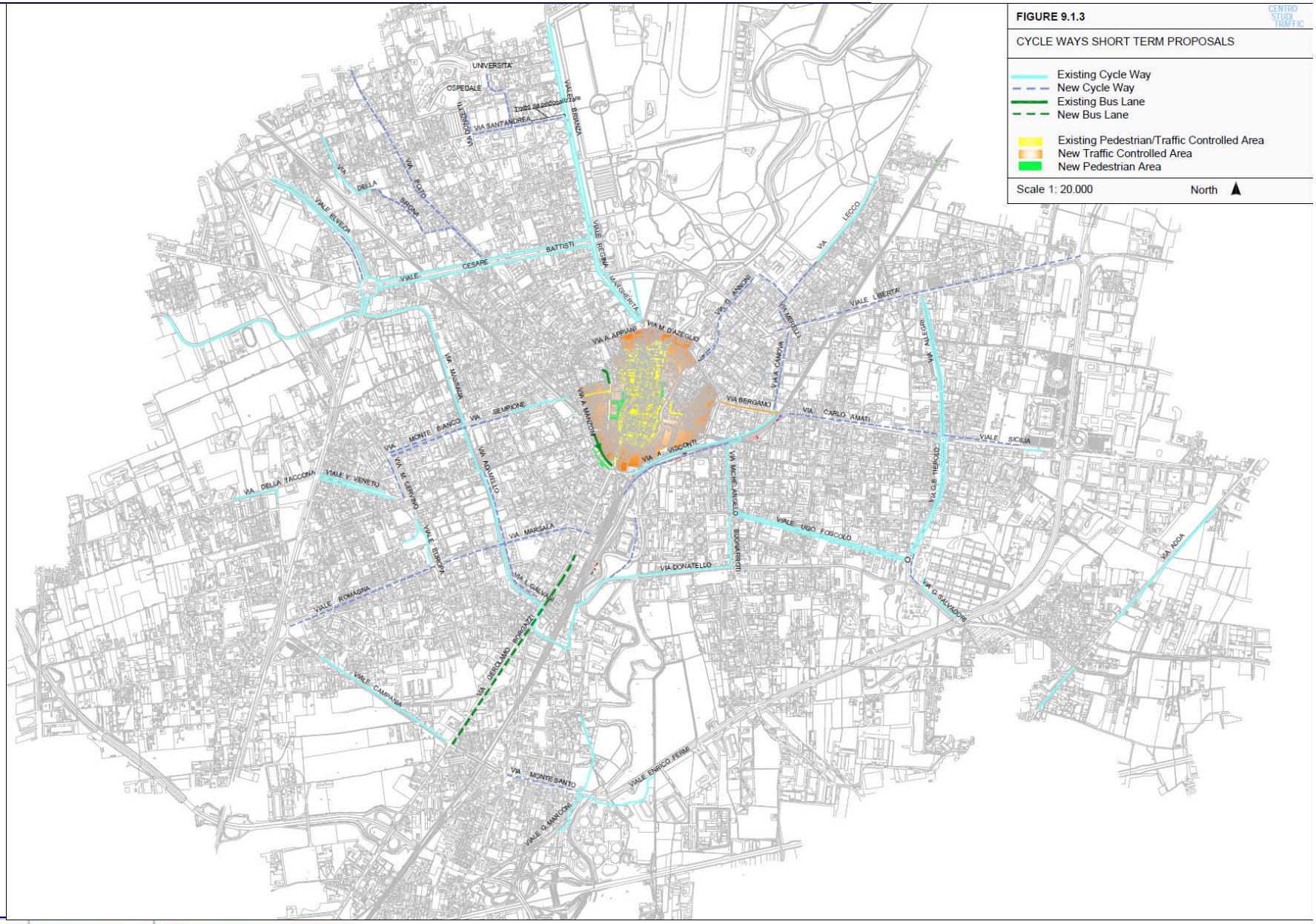


FIGURE 9.1.3
CENTRO STUDI TRAFFIC
CYCLE WAYS SHORT TERM PROPOSALS
Existing Cycle Way
New Cycle Way
Existing Bus Lane
New Bus Lane
Existing Pedestrian/Traffic Controlled Area
New Traffic Controlled Area
New Pedestrian Area
Scale 1: 20.000
North
UNIVERSITA'
OSPEDALE
VIA SANT'ANDREA
VIALE BRIANZA
VIALE REGINA MARGHERITA
VIA DELLA BIRONA
VIA PLATO
VIALE ELVEZIA
VIALE CESARE BATTISTI
VIA LECCO
VIALE LIBERTA'
VIA A. APPIANI
VIA M. D'AZEGLIO
VIA G. ANCONI
VIA MERTOLA
VIA A. CANOVA
VIA TALEGRI
VIA BERGAMO
VIA CARLO AMATI
VIALE SICILIA
VIA A. MANZONI
VIA A. VISCONTI
VIA MASSAIA
VIA SEMPIONE
VIA MONTE BIANCO
VIA ADAMELLO
VIA DELLA TACCONA
VIALE V. VENETO
VIA M. GRAPPA
VIALE EUROPA
VIA MARSALA
VIA MICHELANGELO BUONARROTI
VIALE UGO FOSCOLO
VIA DONATELLO
VIA G.B. TIEPOLO
VIA G. SALVADORI
VIA ADDA
VIA L. GALVANI
VIALE ROMAGNA
VIA GEROLAMO BORGAZZI
VIALE CAMPANIA
VIA MONTE SANTO
VIALE ENRICO FERMI
VIALE G. MARCONI

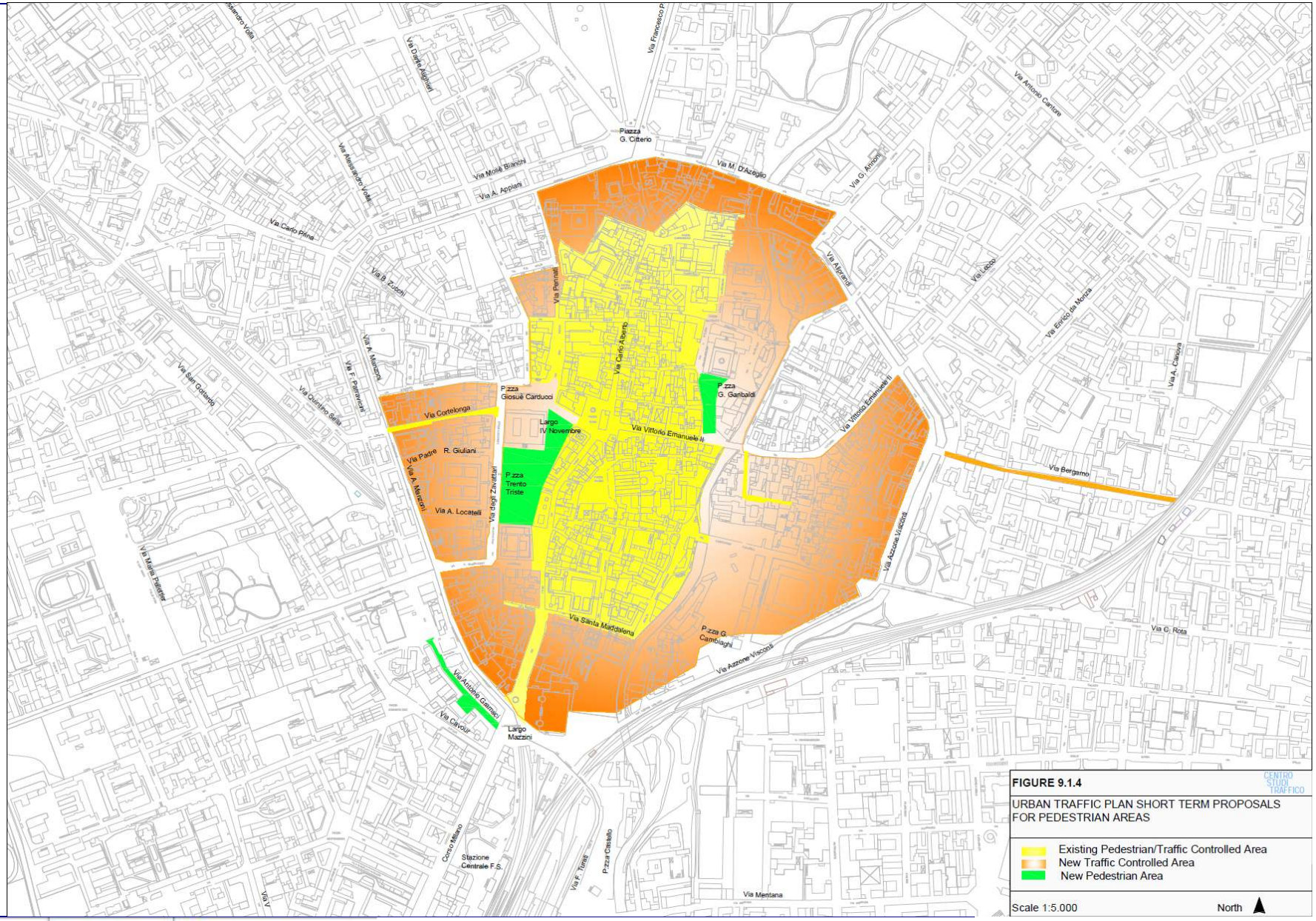


FIGURE 9.1.4

URBAN TRAFFIC PLAN SHORT TERM PROPOSALS FOR PEDESTRIAN AREAS

- Existing Pedestrian/Traffic Controlled Area
- New Traffic Controlled Area
- New Pedestrian Area

Scale 1:5.000 North

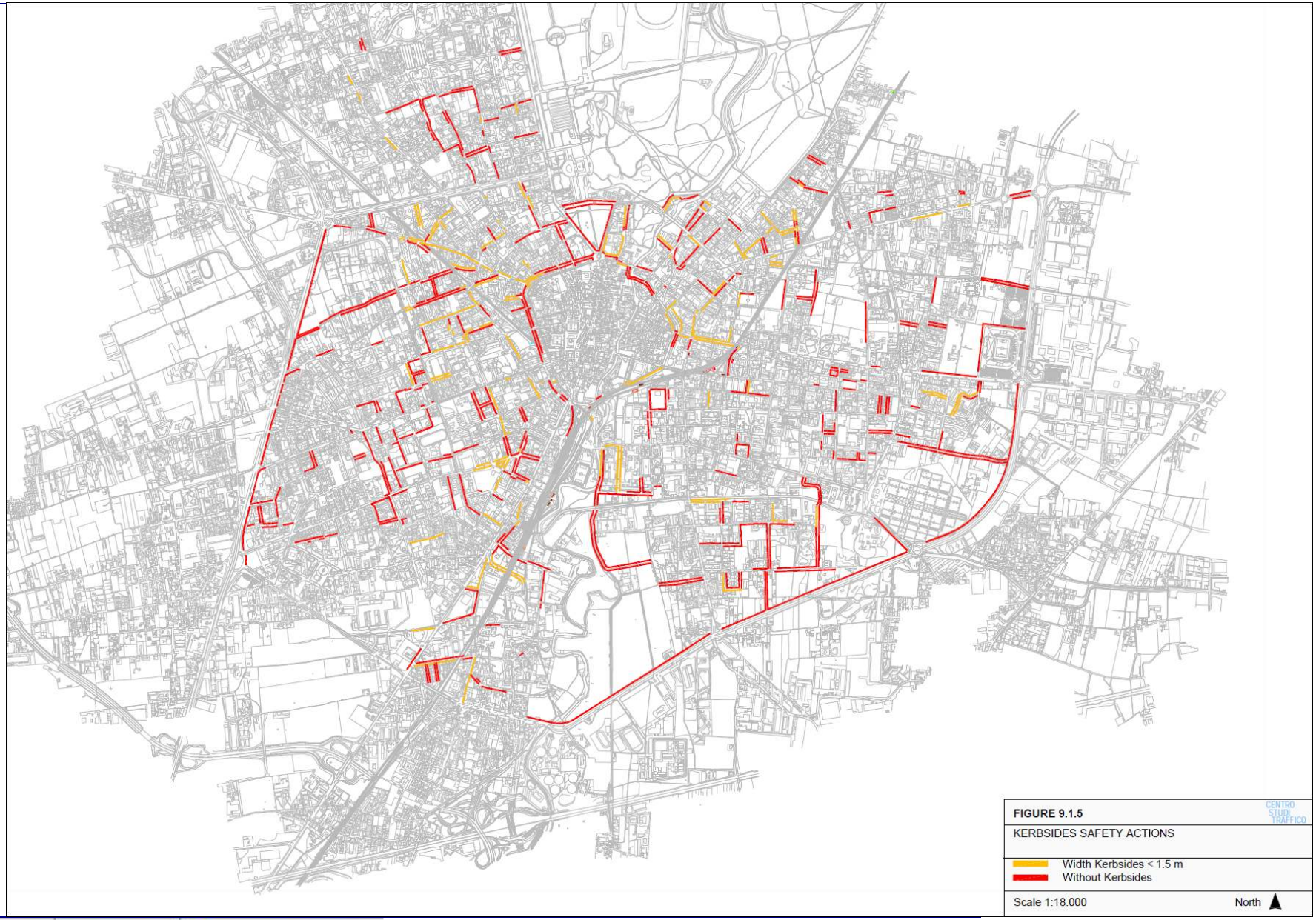


FIGURE 9.1.5
CENTRO STUDI TRAFFICO
KERBSIDES SAFETY ACTIONS
Width Kerbsides < 1.5 m
Without Kerbsides
Scale 1:18.000
North

Short term actions may be self-financed thanks to high parking revenues:

SHORT TERM COSTS/REVENUES DETAILS

			YEAR	UNA TANTUM
PARKING				
revenues/year (net of managing costs)	600 € revenue/year (x parking space) x 4000 parking spaces	=	2 400 000 €	
ELECTRIC MINIBUS (free of charge)				
cost/year	2.5 € /Km x 200 000 Km	=	-500 000 €	
CYCLE-WAYS				
infrastructures costs	165 000 € /Km x 15,2 km	=		-2 500 000 €
KERBSYDE				
infrastructures costs	51.6 Km (new) + 16.7 Km (normalization)	=		-5 000 000 €
ADDITIONAL NOISE REDUCTION ACTIONS		=		-500 000 €
ADDITIONAL ACCIDENTS REDUCTION ACTIONS		=		-1 500 000 €
ARCHIMEDES EXISTING PROJECTS		=		-812 000 € (already financed)
			9 500 000 € (5 YEARS)	-9 500 000 €

4.9.2 Long Term

For the long term scenarios new main road infrastructures are already in construction and financed (Figure 5.1).

For what concerns innovative transport systems a 31.5 km network is proposed for an estimated cost of 300-350 million euros (Figure 5.2).

For what concerns cycling a 24.5 km network is proposed for an estimated cost of 3.5-4 millions of euros (Figure 5.3).

Infrastructures investments require financial support from Central Government and from Regional Government.

For what concerns other lighter long term actions to encourage more sustainable transport modes and to improve road safety it is proposed a self-financed procedure where car users revenues are invested for a better mobility.

An important revenues source is represented by parking fares: in the hypothesis of all Central Area paying parking spaces (nearly 12.000 parking space) the possible year revenues net of managing costs are higher than 7.000.000 Euros (2011 values).

4.10 Responsibilities and Resources

The Sustainable Urban Transport Plan (SUTP) for the City of Monza has been developed, under the supervision of the Assessore for the Mobility, by the Monza Municipality Mobility Direction with the technical co-operation of Centro Studi Traffico of Milano (Figure 10.1).

The SUTP will be submitted to Monza Municipal Council approval then will be applied through a series of sector plans including:

- the Urban Traffic Plan;
- the Parking Plan;
- the Cycle Network Plan;
- the Public Transport Plan;
- the Road Safety Plan.

The Monza Municipality Mobility Direction will provide for the SUTP application with external expertise.

The reached objectives by the Plan application will be monitored with the timing described in the following chapter and will be compared with the prefixed objectives.

The Plan will be updated on the basis of the monitoring results and on the basis of the reached objectives.

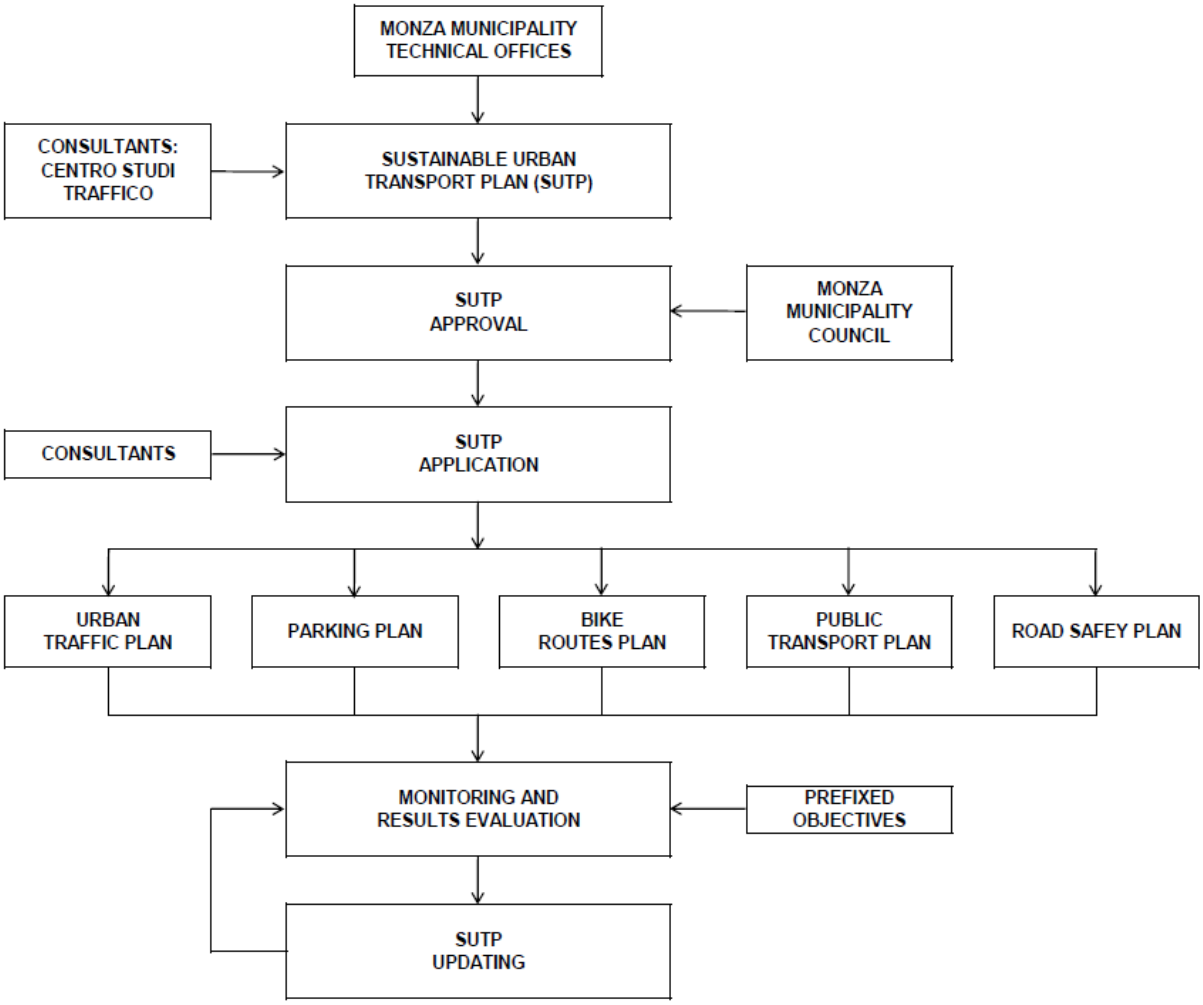


Figure 10.1 - Responsibilities and Resources

4.11 Monitoring Program for the Evaluation of the Results

Data collected and utilized in the present study have been organized within a Mobility Information System for Monza Municipality which represents the framework to monitor the results of the SUTP application.

Monitoring activities concern:

- the land use evolution;
- the new infrastructures;
- the normative actions;
- the mobility demand satisfied by different transport modes;
- air pollution;
- noise;
- road accidents.

Land use and infrastructure monitoring must be continuous as well air pollution and road accident monitoring.

Mobility demand and noise monitoring could follow Urban Traffic Plan timing with an update every 2 years.