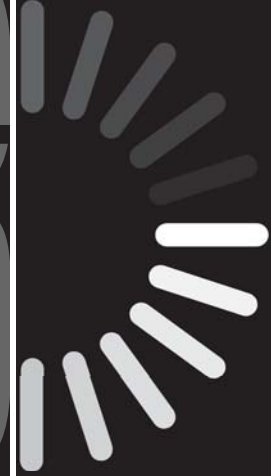


# 4003

UNIT



BOULBON

GRAVESON

02

DOCUMENT  
AREA ANALYSIS

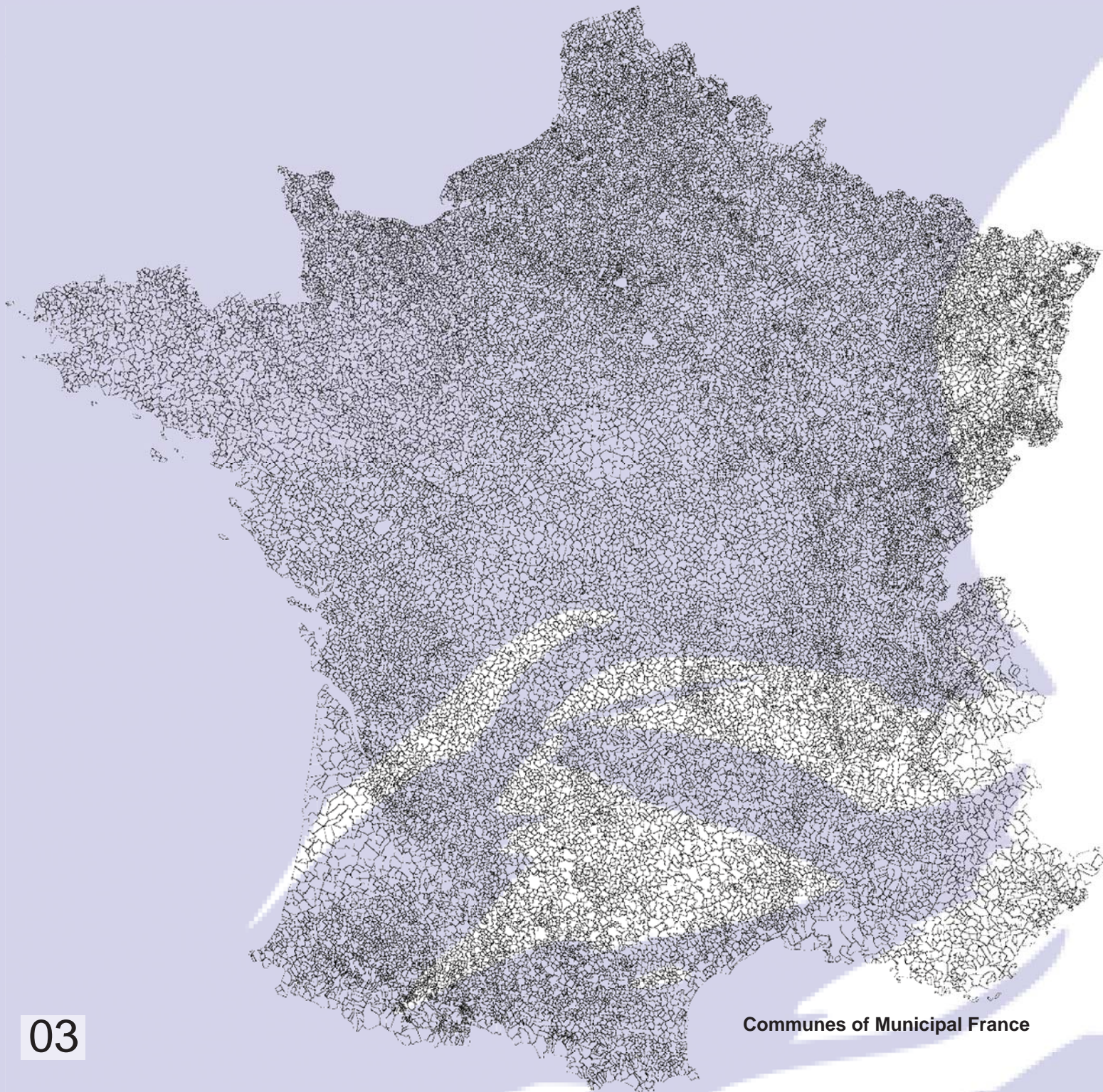


## Preface

This document has been produced jointly between Steven Duffy and Russ Harding as background study material to the Provence and Bouches-du-Rhône area of France, before focusing in on the area around the communes of Graveson and Boulbon in more detail.

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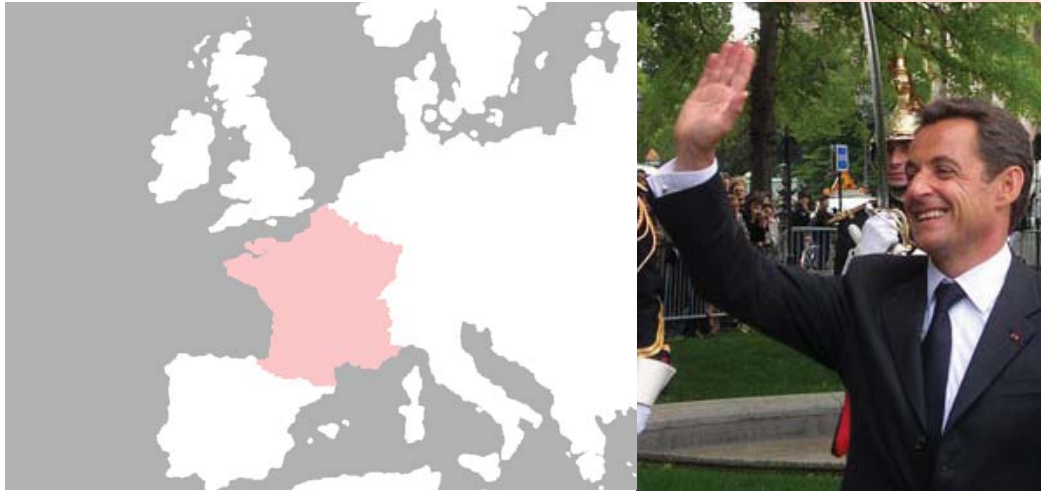




Communes of Municipal France



Regions of France



President Nicolas Sarkozy

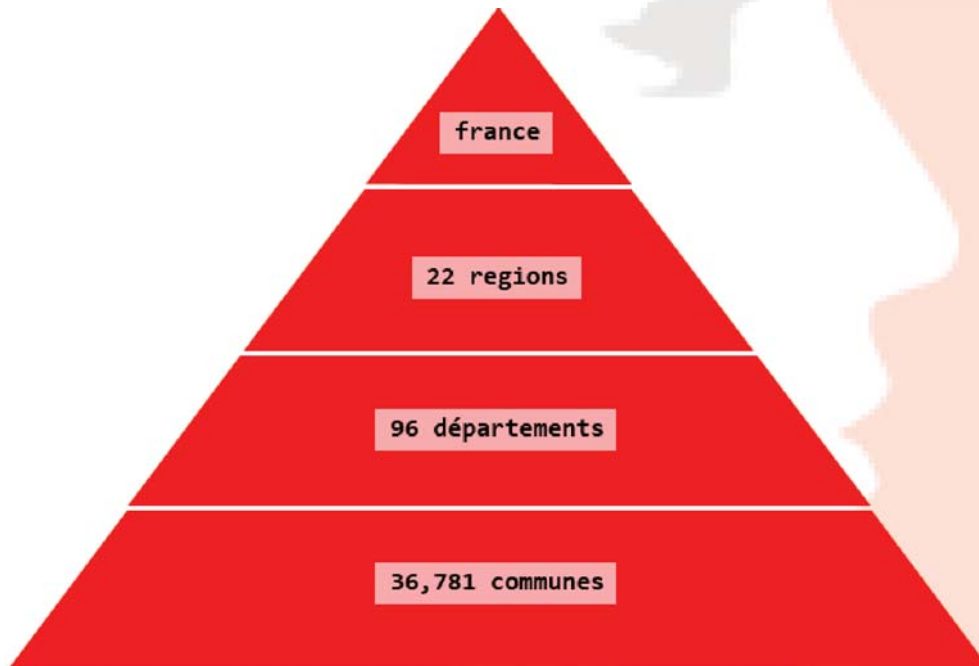


Diagram of French Governance

## French Governance

France is a republic; the head of the executive is the President, elected by universal suffrage, currently Nicolas Sarkozy. The President determines policy with the aid of his Council of Ministers (Conseil des ministres). Municipal France is broken down into smaller areas which are allocated as; 22 regions, 96 départements and 36,781 communes.

Regions do not have legislative autonomy, nor can they issue regulations. They levy their own distinct taxes (and receive a decreasing part of their budget from the national government which gives them a portion of the taxes it levies) and have considerable budgets, managed by a regional council (conseil régional) with elected representatives from the regional elections.

Each département is administered by a conseil général (general council), an assembly elected for six years by universal suffrage, and its executive. The center of administration of a département is called a préfecture (prefecture) or chef-lieu de département. The départements are further divided into communes, governed by municipal councils.

The commune is the lowest level of administrative division in the French Republic. The French word commune appeared in the 12th century, from Medieval Latin communia, meaning a small gathering of people sharing a common life, from Latin communis, things held in common. A French commune can be a city of 2 million inhabitants (as in Paris); a town of 10,000; or just a 10-person hamlet.

Each commune of the French Republic possesses a mayor (maire) and a municipal council (conseil municipal) which manage the commune from the mairie (town hall), with exactly the same powers no matter the size of the commune.



Col du Galibier

45°3 52'N 6°24 29'E  
2,645m alt.

Les Bans

44°5 48'N 6°20 12'E  
3,669m alt.

Sans Nom

44°5 38'N 5°22 52'E  
3,913m alt.

Plateau de Bure

44°4 24'N 6°03 11'E  
2,550m alt.

Col de la Bonette

44°1 42'N 6°47 57'E  
2,715m alt.

Sisteron

44°1 36'N 5°56 32'E  
1,145m alt.

Col de Tende

44°0 01'N 7°33 56'E  
1,870m alt.

Mount Raous

43°51 55'N 4°42 32'E  
167m alt.

Alpilles

43°45 33'N 4°52 57'E  
387m alt.

Castellane

43°50 51'N 6°30 50'E  
761m alt.

Massif de la Sainte Baume

43°01 31'N 5°45 45'E  
1,148m alt.

Massif des Maures

43°01 06'N 6°30 40'E  
800m alt.

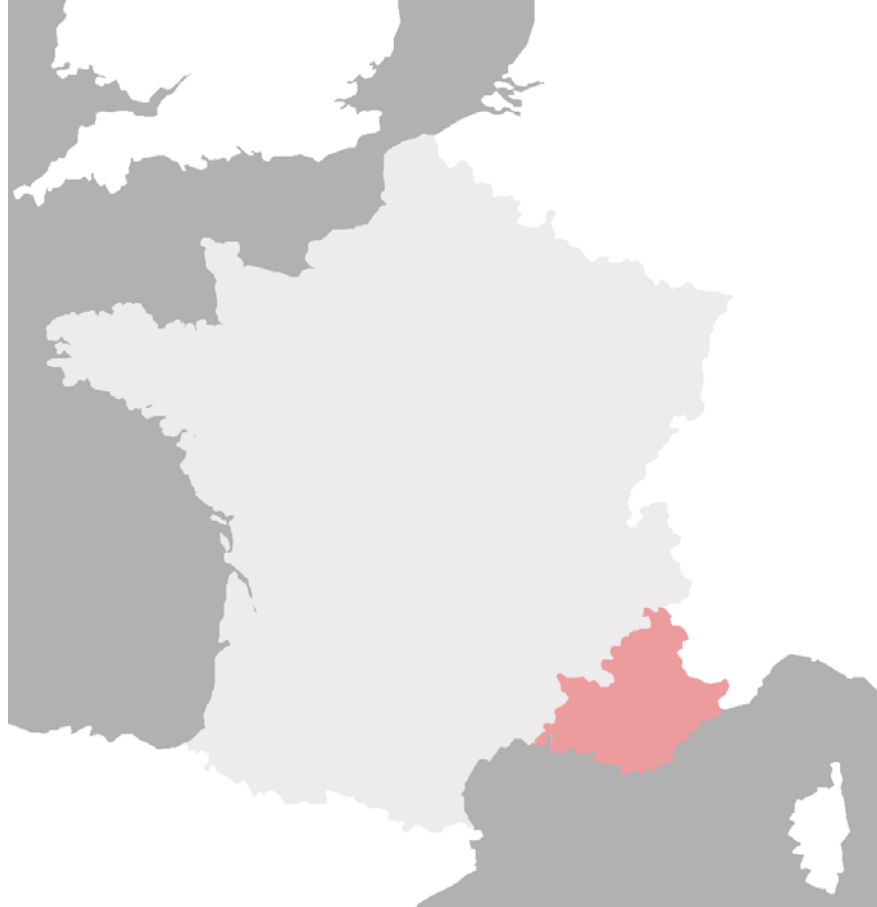
Key



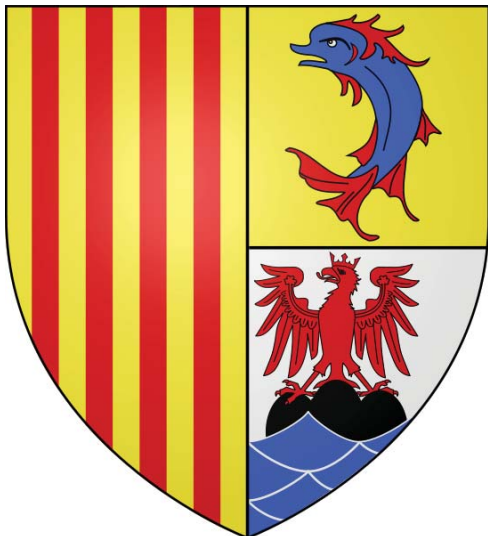
Mountain ranges



Main rivers



Région Provence-Alpes-Côte d'Azur



## Région Provence-Alpes-Côte d'Azur (Provence)

Provence is one of the 22 regions of municipal France. It is located in the south-east of the country alongside the border with Italy on the Mediterranean French Riviera coastline.

The region contains 6 of the French departments, being;

- Alpes-de-Haute-Provence
- Hautes-Alpes
- Alpes-Maritimes
- Bouches-du-Rhône
- Var
- Vaucluse

The region is very mountainous, as demonstrated on the map opposite resulting in much of the built-up areas being to the south, along the coastline.

The population of Provence is around 4,818,000 making it the 3rd largest populated region in France. This large cities of Marseille and Nice are within Provence, with Marseille being the regional capital.

The region is very popular with tourists, particularly for its unique landscape and culture, Mediterranean beaches, climate and coastline.

Economically the region is the third most important in France just behind Île-de-France and Rhône-Alpes. Its GDP in 2006 was €130,178 million (\$US163,600 million) and per capita GDP was €27,095 (\$US34,051).

The region logo displays the coat of arms created in the 1990s and which combines the coats of arms of the old provinces making up Provence-Alpes-Côte d'Azur.

Sources:

<http://www.insee.fr/en/bases-de-donnees/default.asp?page=recensements.htm>





Sénanque Abbey, near Gordes, Provence



Pont du Gard, 1C BC





Roman France and Provence

## A Brief History of Provence

The area of Provence has been inhabited since prehistoric times. In the 2nd century BC the region appealed to Rome for help against the Ligures, a Celtic invader. After successfully securing the region, the Romans decided to stay in France and began fortifying communes and building their roads and aqueducts. Provence is so named because it was the first Roman province outside of Italy.

Following the fall of the Roman Empire, the Provence region was ruled by a vast number of invaders before 'Boson of Provence' was elected the first leader of the independent state of Provence in the 9th century.

The Catalan dynasty in the 12th century saw the construction of many important cathedrals and abbeys in Provence which are still present across the region today. Three Cistercian monasteries were built in remote parts of Provence in the 12th century, far from the politics of the major cities; the Sénanque, Le Thoronet and Silvacane Abbey.

By the 14th century, the population of Provence (around 400,000) was halved due to the outbreak of the Black Plague. The defeat of the French Army in the Hundred Years War saw many Provence towns build castles, towers and walls to defend themselves against former soldiers and invading armies.

In 1481, the last King of the independent Provence died and rule was passed on to King Louis XI of France incorporating Provence into the royal domain of mainland France.

## A Brief History of Provence continued.

Provence suffered as much as the rest of the country during the French Revolution until Napoleon came to power in 1795. Provence enjoyed prosperity in the 19th century; the ports of Marseille and





Corbusier's Unité d'Habitation Marseille



Avignon TGV Station, 2001

Toulon connected Provence with the expanding French Empire in North Africa and the Orient - especially after the opening of the Suez Canal in 1869.

Railways connected Paris with Marseille in 1848, and then with Toulon and Nice in 1864. The second half of the 19th century saw a revival in the regional Provençal language and culture, particularly traditional rural values which inspired many writers and poets and artists.

Provence is divided between rural and urban communities. Much of the urban communities were destroyed in the World Wars and the region struggled to repair the port towns and railways. Famous examples of attempts to rehouse many of the people in these war-damaged areas included Le Corbusier's Unité d'Habitation in Marseille.

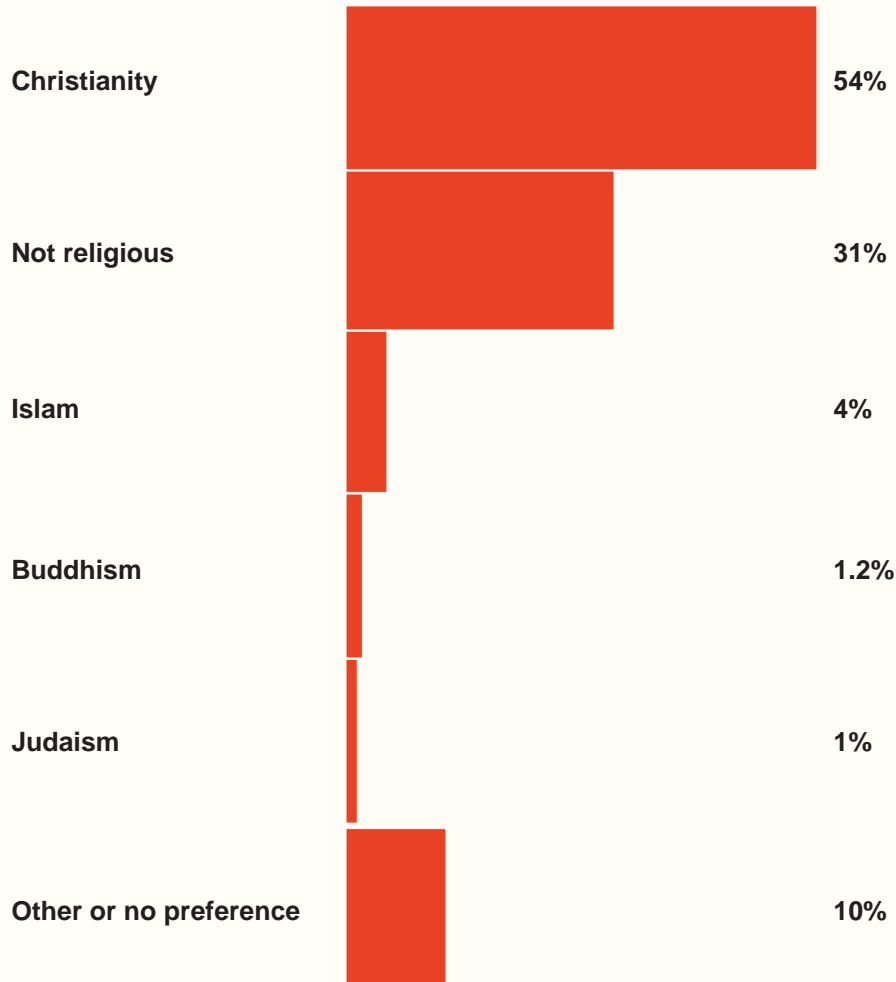
At the end of the 20th century and the beginning of the 21st century, the residents of Provence were struggling to reconcile their economic development and population growth with their desire to preserve the landscape and culture that make Provence so unique.



Chateau of René, Tarascon, 15C



### Religion in France:



### Religion

France as a country is not particularly religious, however religion has always played an important role in Provence culture and architecture, particularly since the 12th Century.

According to a January 2007 poll by the Catholic World News: 51% identified as being Catholics, 31% identified as being agnostics or atheists (another poll gives atheists proportion equal to 27%), 10% identified as being from other religions or being without opinion, 4% identified as Muslim, 3% identified as Protestant, 1% identified as Jewish.

The concept of laïcité exists in France, the French government is legally prohibited from recognising any religion. Instead, it recognises religious organisations, according to formal legal criteria that do not address religious doctrine. Conversely, religious organisations should refrain from intervening in policy-making. Tensions occasionally erupt about alleged discrimination against minorities, especially against Muslims in France.

The three Cistercian monasteries built in remote parts of Provence in the 12th century, away from the major cities; the Sénanque, Le Thoronet and Silvacane Abbey, were culturally important monasteries which followed the Rule of St Benedict.

By rejecting the developments the Benedictines had undergone, the monks tried to reproduce life exactly as it had been in Saint Benedict's time.

The most striking feature in the reform was the return to manual labour, especially field-work, a special characteristic of Cistercian life which is still adopted today, particularly in grape harvesting and lavender harvesting.



## Provence Culture

### Language

Historically the language spoken in Provence was Provençal, a dialect of the Occitan language, also known as langue d'oc, and closely related to Catalan. There are several regional variations: vivaro-alpin, spoken in the Alps; and the provençal variations of south, including the maritime, the rhodanien (in the Rhone Valley) and the niçois (in Nice).

Provençal was widely spoken in Provence until the beginning of the 20th century, when the French government launched an intensive and largely successful effort to replace regional languages with French. Today Provençal is taught in schools and universities in the region, but is spoken regularly by a small number of people, probably less than five hundred thousand, mostly elderly.

### Arts and Literature

In the 19th and 20th century, the climate, unique landscape and lifestyle of Provence attracted many writers and artists. It was particularly popular among British, American and Russian writers in the 1920s and 1930s.

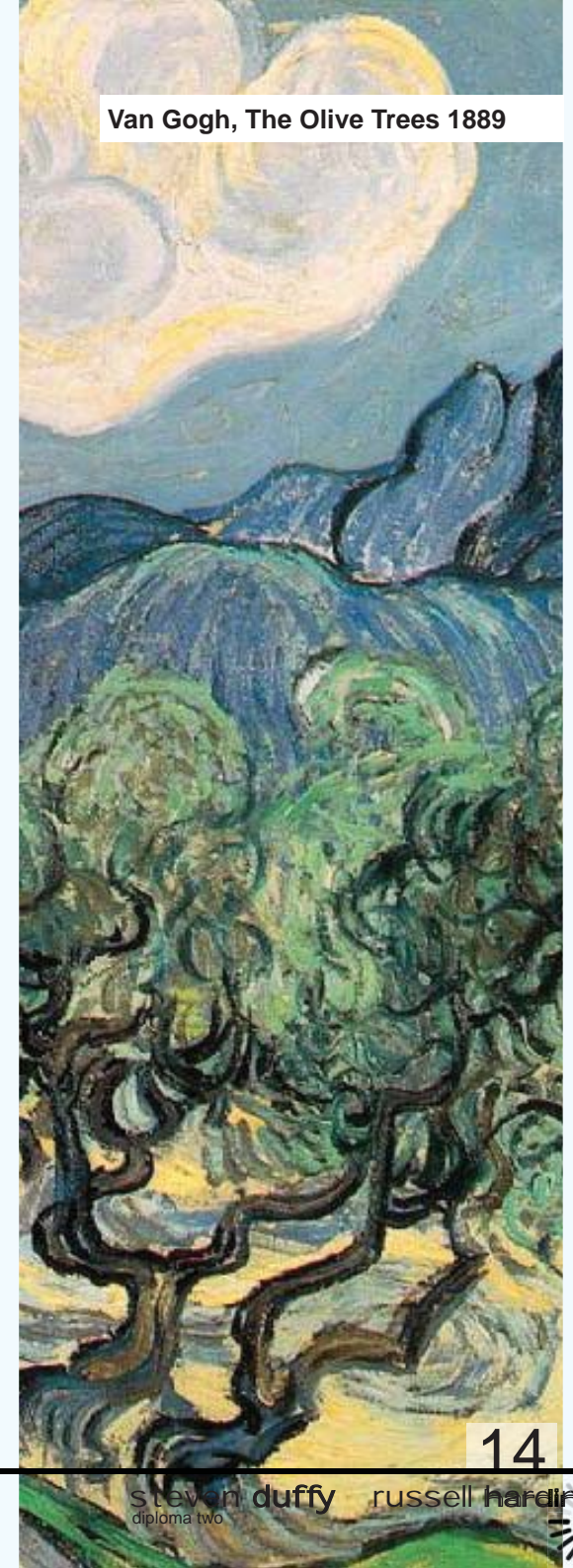
In the 19th and 20th centuries, many of the most famous painters in the world converged on Provence, drawn by the climate and the clarity of the light.

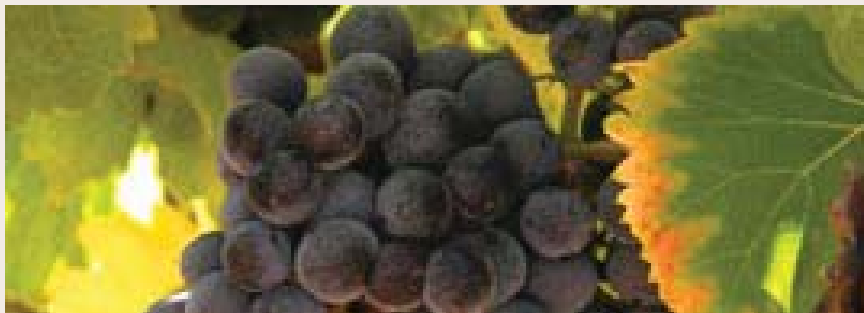
The special quality of the light is partly a result of the Mistral wind, which removes dust from the atmosphere, greatly increasing visibility. The most notable of such artists perhaps were Paul Cézanne (1839-1906), Vincent van Gogh (1853-1890), Pablo Picasso (1881-1973) and Henri Matisse (1869-1954).

Van Gogh, Starry Night 1889



Van Gogh, The Olive Trees 1889





## Provence Culture

### Drink

The wines of Provence were probably introduced into Provence around 600 B.C. by the Greek Phoceans who founded Marseille and Nice. After the Roman occupation, in 120 B.C. the Roman Senate forbade the growing of vines and olives in Provence, in order to protect the profitable trade in exporting Italian wines, but in the late Roman empire retired soldiers from Roman Legions settled in Provence and were allowed to grow grapes.

The wines of this region are not particularly sought-after and were described as; “the whites are dry and can lack the acidity to be refreshing; the reds are straightforward, strong and a trifle dull.”

The wines of Provence are grown under demanding conditions; hot weather and abundant sunshine which ripens the grapes quickly; little rain, and the Mistral Wind. The great majority of the wines produced in Provence are rosés.

Provence creates a massive quantity of wine, although little of it is drunk, of even of a decent quality to drink.

---

1 Hugh Johnson, *The World Atlas of Wine*, Mitchell Beazley Publishers, 1971







## Provence Culture

### Foods

The cuisine of Provence is the result of the warm, dry Mediterranean climate; the rugged landscape is good for grazing sheep and goats but, other than within the Rhone Valley, has poor soil for large-scale agriculture and shortages of fresh water supplies. The Mediterranean Coastline means an abundance of seafood in the region.

The fish frequently found on menus in Provence are the rouget, a small red fish usually eaten grilled, and the loup, often grilled with fennel.

The basic ingredients are olives and olive oil; lavender; garlic; sardines, rockfish, sea urchins and octopus; lamb and goat; chickpeas; herbs and local fruits, such as grapes, peaches, apricots, strawberries and cherries.





Gordes, Provence





## Tourism: France and Provence

In 2007, France attracted 81.9 million foreign tourists, a 3.8% increase compared to 2006, making it the most popular tourist destination in the world.<sup>1</sup>

Paris, the capital city, attracts tourists with museums such as the Louvre and Musée d'Orsay, and attractions like the Eiffel Tower, Arc de Triomphe, and the cathedral of Notre-Dame. While the eastern side of France is popular for its Alps skiing resorts.

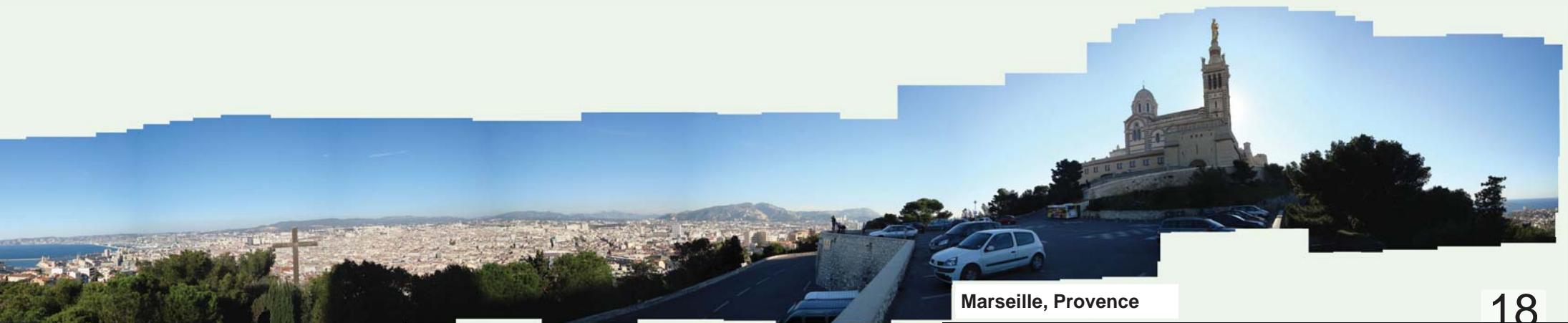
The Provence region is a particularly popular tourist destination, situated in the south of the country with many Mediterranean coastal towns and communes. The coastal region is very busy in Summer. Towns and cities such as Avignon, Marseille and Nice all attract millions of tourists annually.

The unique hilly and mountainous landscape, culture and architecture of Provence also attracts tourists to its' more rural and traditional towns and villages, such as Saint-Rémy-de-Provence and Les Baux. Many of these towns allow tourists to catch a glimpse of their Medieval pasts whilst still catering for the modern tourist.

Tourism is one of France's major industries nationwide, representing about 7% of the national economy.

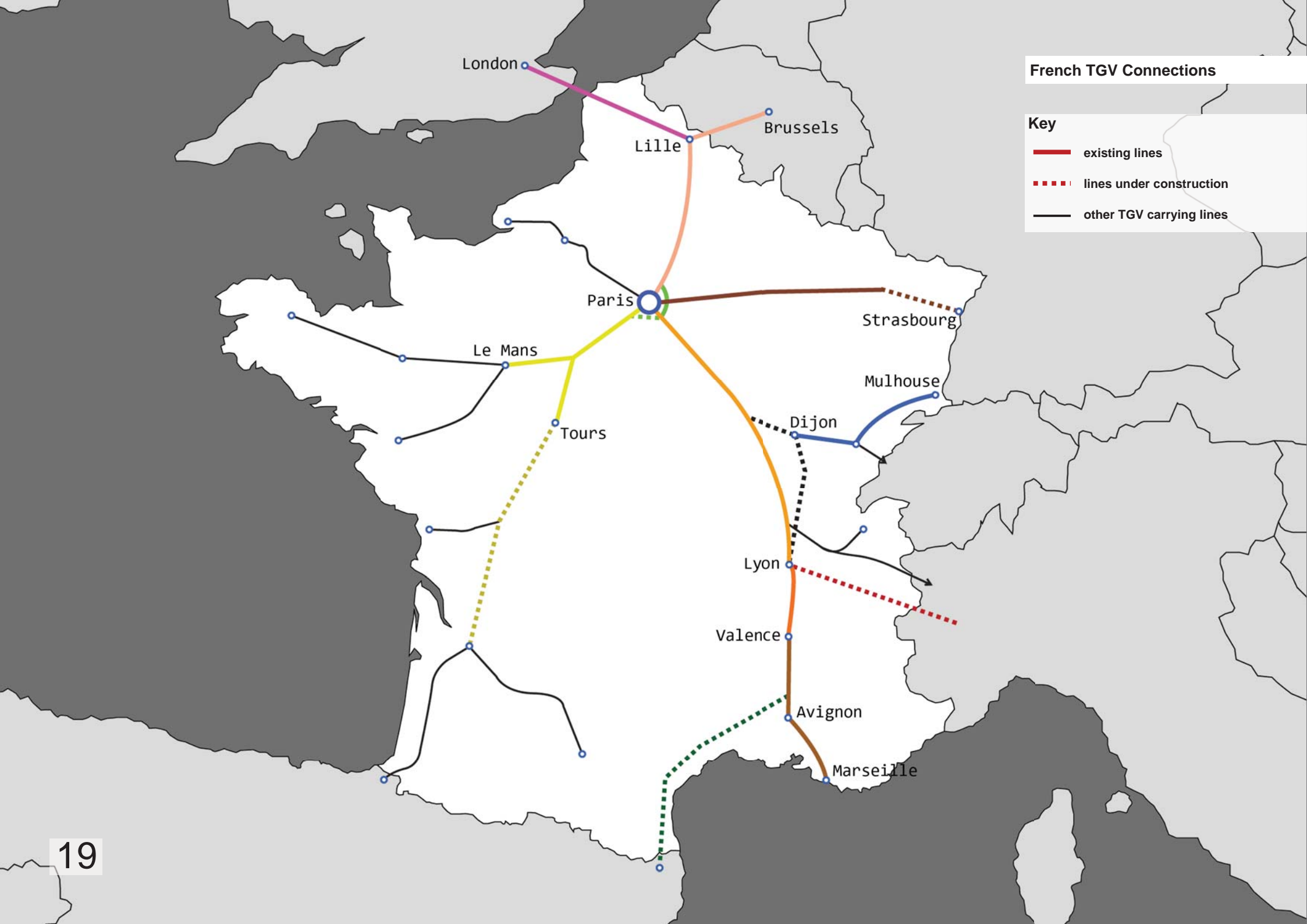
The new Eurostar train service from London, and the fast T.G.V. services in France have made the whole country suddenly very accessible, particularly Provence with connections to Avignon and Marseille. This has allowed quick, easy access both to the French and international tourists with direct links to the UK, Germany, Spain, Italy and Belgium.

<sup>1</sup> Directorate of Tourism, Government of France. [http://www.tourisme.gouv.fr/fr/z2/stat/tis/att00018288/TIS\\_EVE2007\\_2008-5.pdf](http://www.tourisme.gouv.fr/fr/z2/stat/tis/att00018288/TIS_EVE2007_2008-5.pdf). Retrieved on 2009-02-17.



Marseille, Provence





**French TGV Connections**

**Key**

- existing lines
- lines under construction
- other TGV carrying lines

### Transport links to Provence

The TGV fast-line train service is the pride of the French transport system. "TGV trains are loved by the French, who are very proud of their flagship high-speed train service. It's hardly surprising, as the TGV is cheap, quick, efficient, comfortable and very reliable.

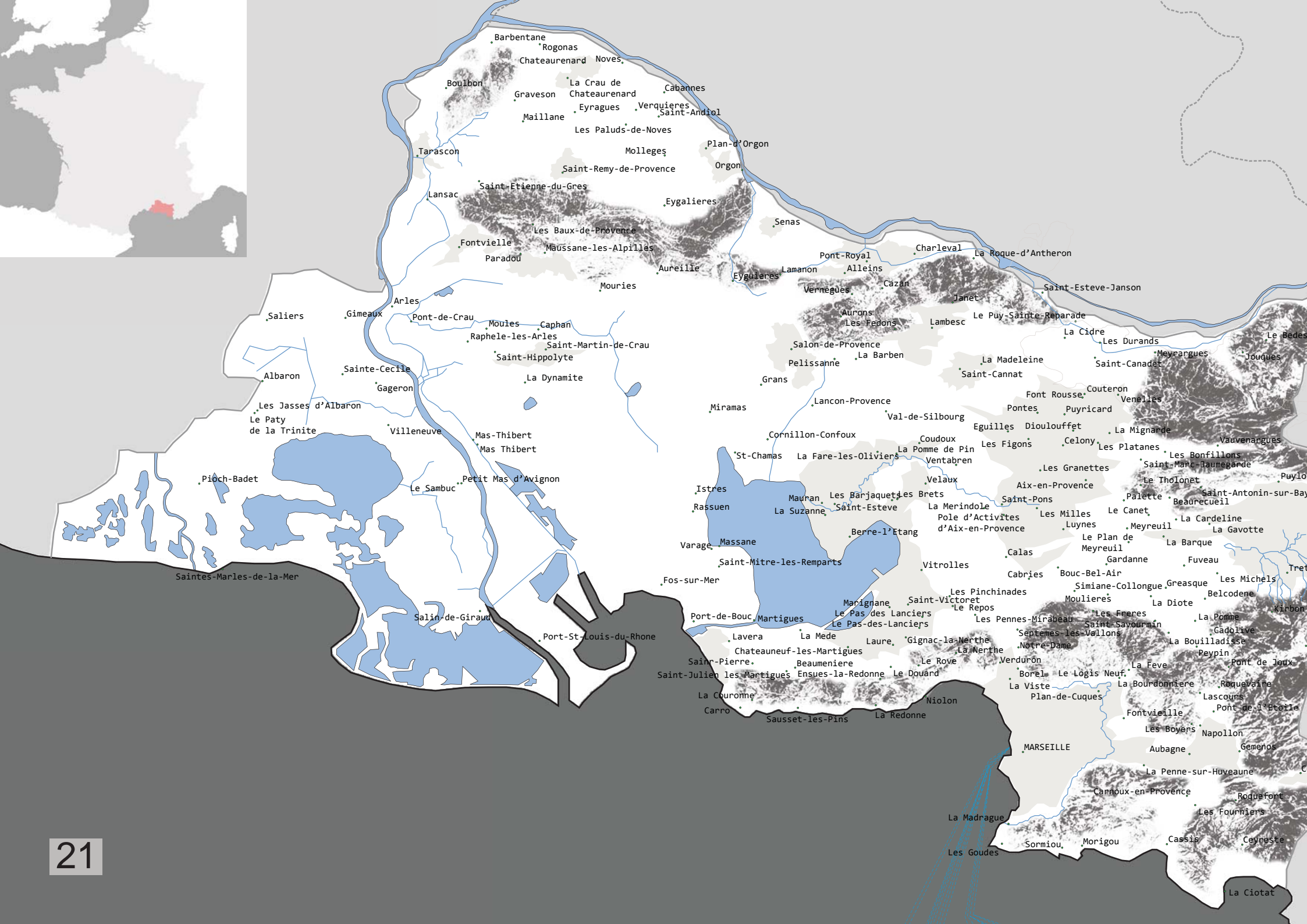
TGV trains serve in excess of 150 destinations across Paris, as well as carrying passengers high-speed across the border into Belgium, Germany, Switzerland, Luxembourg and Italy, where passengers can connect with other European high-speed services and rail networks.

If you are travelling to the continent by Eurostar, it's easy to make connections with TGV services in Paris or in many cases, in Lille."<sup>1</sup>

The new Eurostar train service from London, and the fast T.G.V. services in France have made the whole country suddenly very accessible, particularly Provence, with connections to Avignon and Marseille. This has allowed quick, easy access both for the French and international tourists with direct links to the UK, Germany, Spain, Italy and Belgium.

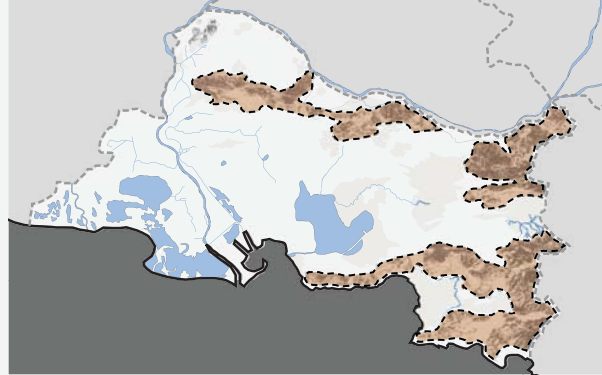
<sup>1</sup> <http://www.tgv.co.uk/Default.aspx?tabid=1127>



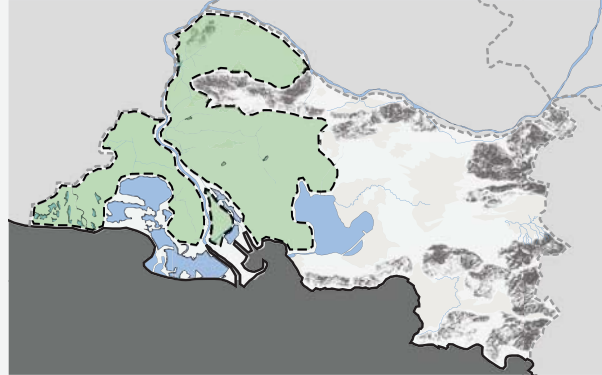




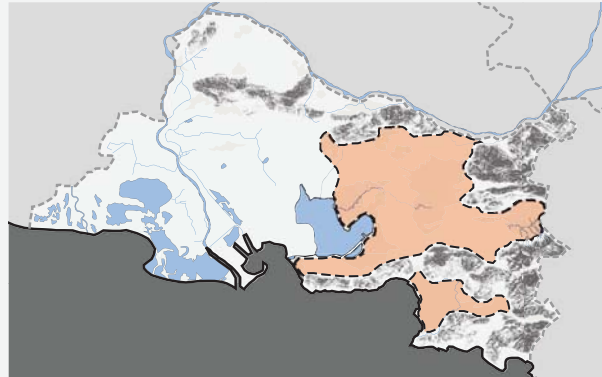
**Topography: Mountains**



**Land use: agricultural fertile lands**



**Land use: urban developments**



## Bouches-du-Rhône

The Bouches-du-Rhône department covers the south-western side of the Provence region. It is surrounded by the departments of Gard on the west, Vaucluse on the north, and Var on the east, and by the Mediterranean Sea on the south.

Like much of Provence, Bouches-du-Rhône is very mountainous and this has restricted where large communities have developed, as shown on the map opposite. The large city of Marseille is a very important port in the south of the department.

With a population of around 1,916,494 inhabitants, Bouches-du-Rhône is ranked the 3rd most populated department in France only after Paris and the Nord.

Bouches-du-Rhône translates to 'Mouths of the Rhône River'. The Rhône river and delta are very important to this area and provide water and fertile land which can be used for agriculture. The department is very mixed between very dense populated areas and very spacious rural communes.

The department is well represented in French art. Paul Cézanne painted numerous representations of the Mont Sainte-Victoire. Vincent van Gogh spent much of his life in Arles, painting many scenes in the area.

The department is a very popular tourist destination for those looking to experience the unique landscapes, culture and foods of this coastal department and the Mediterranean climate and beaches.

Sources:

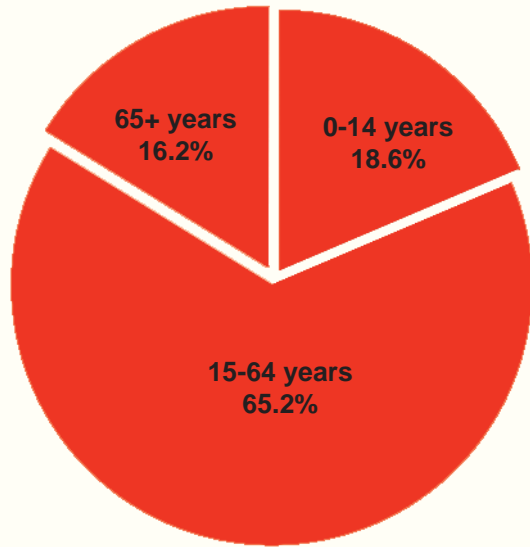
<http://www.insee.fr/en/bases-de-donnees/default.asp?page=recensements.htm>







## Population Breakdown:



## Bouches-du-Rhône Demographics

Department Reference: 13

Region: *Provence*

Consists of 119 communes.

Current President of General Council:

*Jean-Noël Guérini*

Population: 1,916,494<sup>1</sup>

Land area: 5,087 km<sup>2</sup>

Pop. Density: 377/km<sup>2</sup>

<sup>1</sup> <http://www.insee.fr/en/bases-de-donnees/default.asp?page=recensements.htm>



## Bouches-du-Rhône Demographics

### Bouches-du-Rhône Demographics

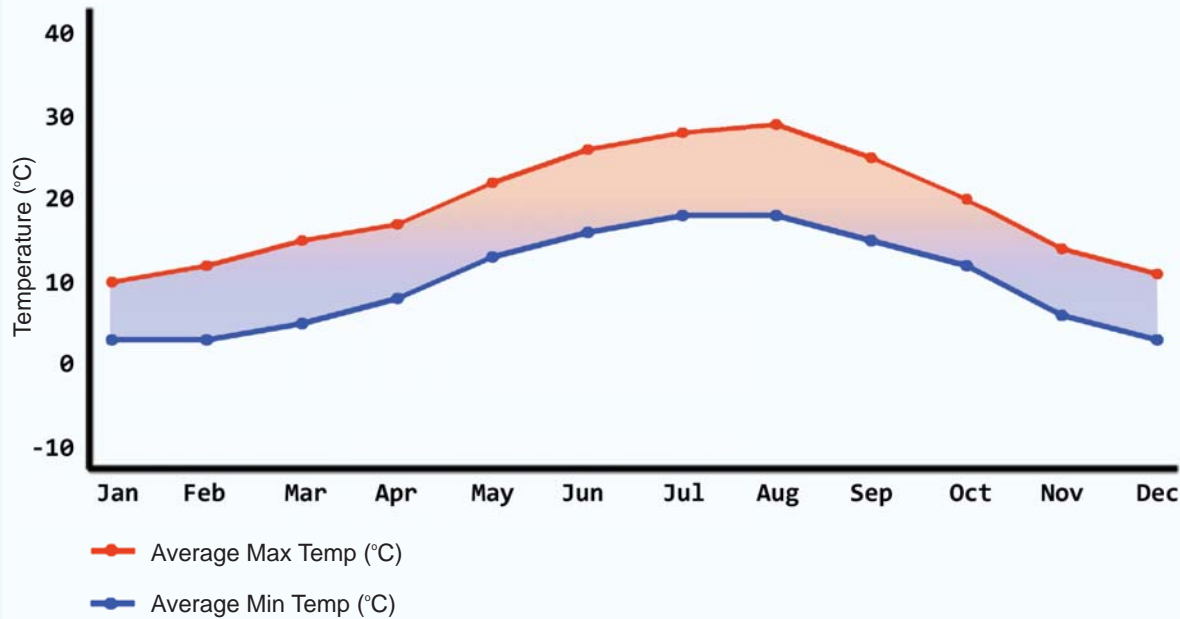
land uses, jobs etc



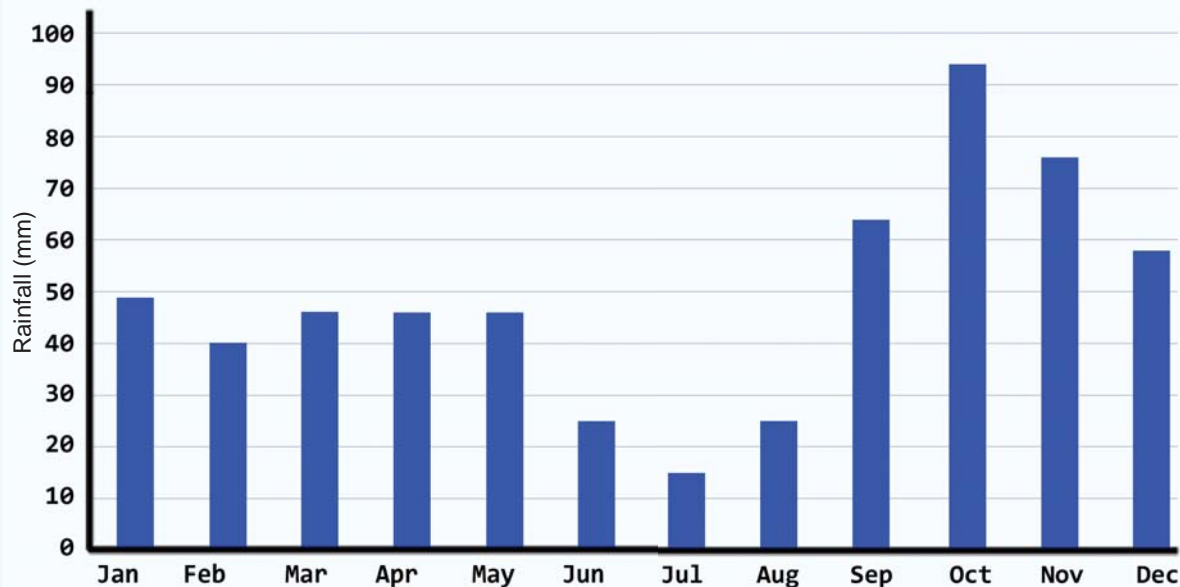
### Bouches-du-Rhône Average Climate Information

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Relative Humidity (%)	77	70	65	62	64	56	54	60	64	73	74	75
Hours of Sun	4	6	8	8	9	11	12	10	9	6	5	4
Precipitation (mm)	49	40	46	46	46	25	15	25	64	94	76	58
Precipitation Days	15	6	9	10	10	6	5	6	8	12	13	9

### Bouches-du-Rhône Average Temperatures



### Bouches-du-Rhône Average Precipitation



### Bouches-du-Rhône Climates

The Bouches-du-Rhône region has a very typical Mediterranean climate, characterized by hot, dry summers, mild winters, little snow, and abundant sunshine as indicated by the graphs opposite.

Within the whole of Provence, and Bouches-du-Rhône, there are micro-climates and local variations, ranging from the Alpine climate inland from Nice to the continental climate in the northern Vaucluse.

The winds of Provence are an important feature of the climate, particularly the mistral, a cold, dry wind which, especially in the winter, blows down the Rhone Valley to the Bouches-du-Rhône and the Var Departments, and often reaches over one hundred kilometers an hour.

The mistral in France is a fresh or cold, often violent, and usually dry wind, blowing throughout the year but is most frequent in winter and spring. It blows from the northwest or north of Europe through the valley of the Rhône River to the Mediterranean. It also affects the whole of Sardinia in Italy.

The mistral is usually accompanied by clear and sunny weather, and it plays an important role in creating the climate of Provence. It can reach speeds of more than ninety kilometers an hour, particularly in the Rhone Valley.

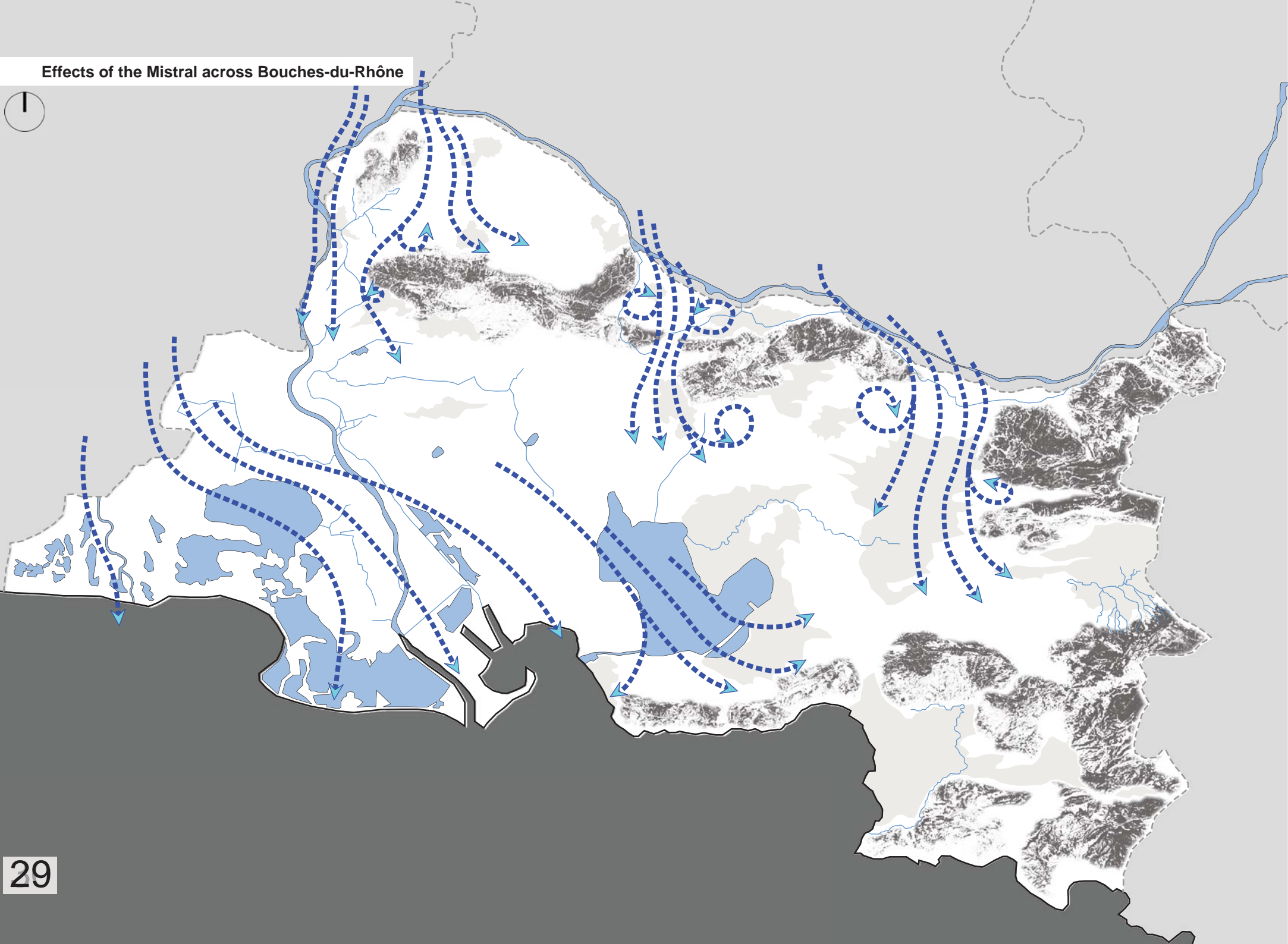
The mistral is a dry wind, and its arrival almost always clears the skies and dries the air. The Mistral helps explain the unusually sunny climate (2700 to 2900 hours of sunshine a year) and clarity of the air of Provence. When other parts of France have clouds and storms, Provence is rarely affected for long, since the mistral quickly clears the sky. In less than two hours, the sky can change

Weather Station:  
St. Remy-de-Provence (Bouches-du-Rhône)

Source of data:  
<http://zoover.co.uk/france/provence-alps-french-riviera/st-remy-de-provence-bouches-du-rhone/weather>



# Effects of the Mistral across Bouches-du-Rhône



from completely covered to completely clear.

The mistral also blows away the dust, and makes the air particularly clear, so that during the mistral it is possible to see mountains 150 kilometers and farther away.

The mistral plays an important part in the life and culture of Provence, The 'mas' (farmhouse) traditionally faces south, with its back to the mistral. The bell towers of villages in Provence are often open iron frameworks, which allow the wind to pass through.

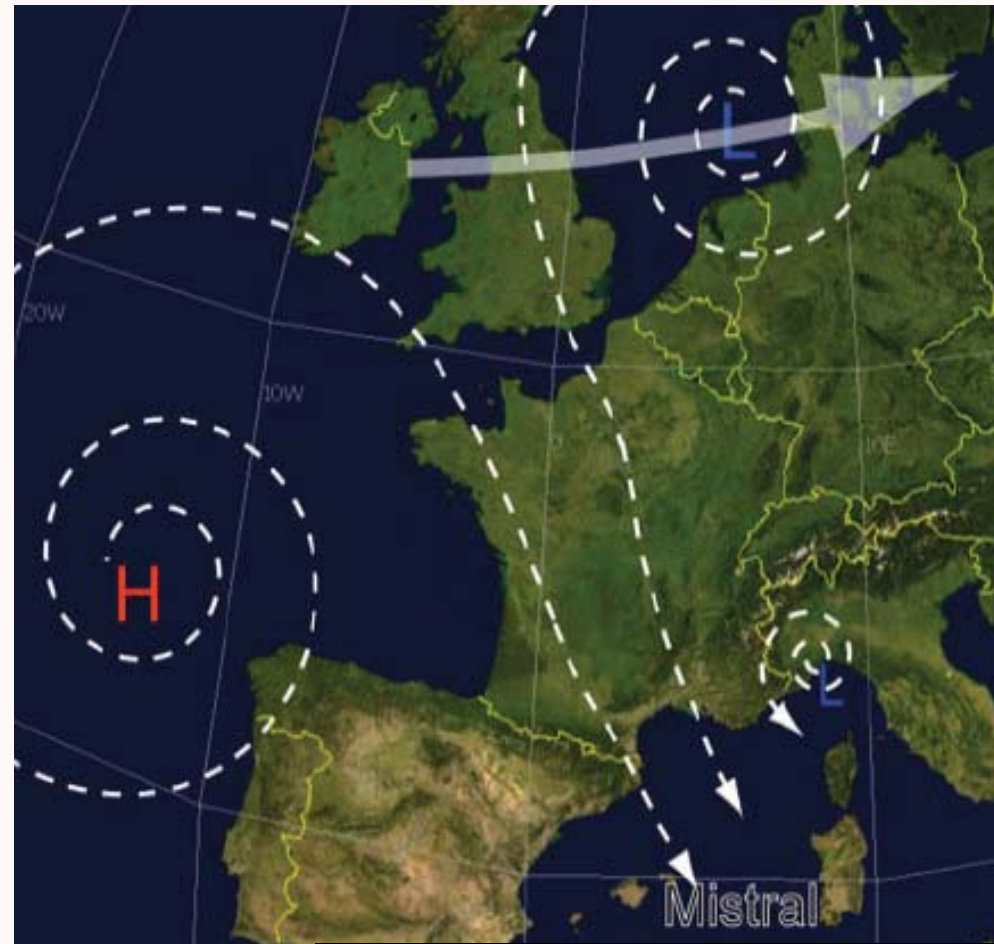
The mistral is an example of a katabatic wind, which is created by the difference in pressure between the cold air of a high pressure system over the Atlantic or northwest Europe and a low pressure system over the Gulf of Lion or the Gulf of Genoa in the Mediterranean. The high-pressure air flows south through the Rhone Valley, gathering speed as it is funneled between the Alps and the Massif Central.

In France, the mistral particularly affects Provence, Languedoc east of Montpellier, and the department of the Var to the west of Frejus, as well as all of the Rhone Valley from Lyon to Marseille as far as Corsica and Sardinia. The mistral usually blows from northwest or north, but in certain pre-alpine valleys and along the Cote d'Azur, the wind is channelled by the mountains so that it blows from east to west. Sometimes it also blows from the north-north-east toward the east of Languedoc as far as Cap Béar.

Frequently the mistral will affect only one part of the region, particularly when it is not caused by a flow of air from the northwest.

The summer mistral, unlike the others, is created by purely local conditions. It usually happens in July, and only in the valley of the Rhone and on the coast of Provence. It is caused by a thermal depression over the interior of Provence (The Var and Alpes de Haute-Provence), created when the land is overheated. This creates a flow of air from the north toward the east of Provence. This wind is frequently cancelled out close to the coast by the breezes from the sea. It does not blow for more than a single day, but it is feared in Provence, because it dries the vegetation and it can spread forest fires.

The diagram opposite shows the effects of the mistral on the Bouches-du-Rhône area.





Power Plant

Moulon de Ble  
153m Alt.

Roque Tournade  
127m Alt.

Boulbon

Rochers de Raous  
168m Alt.

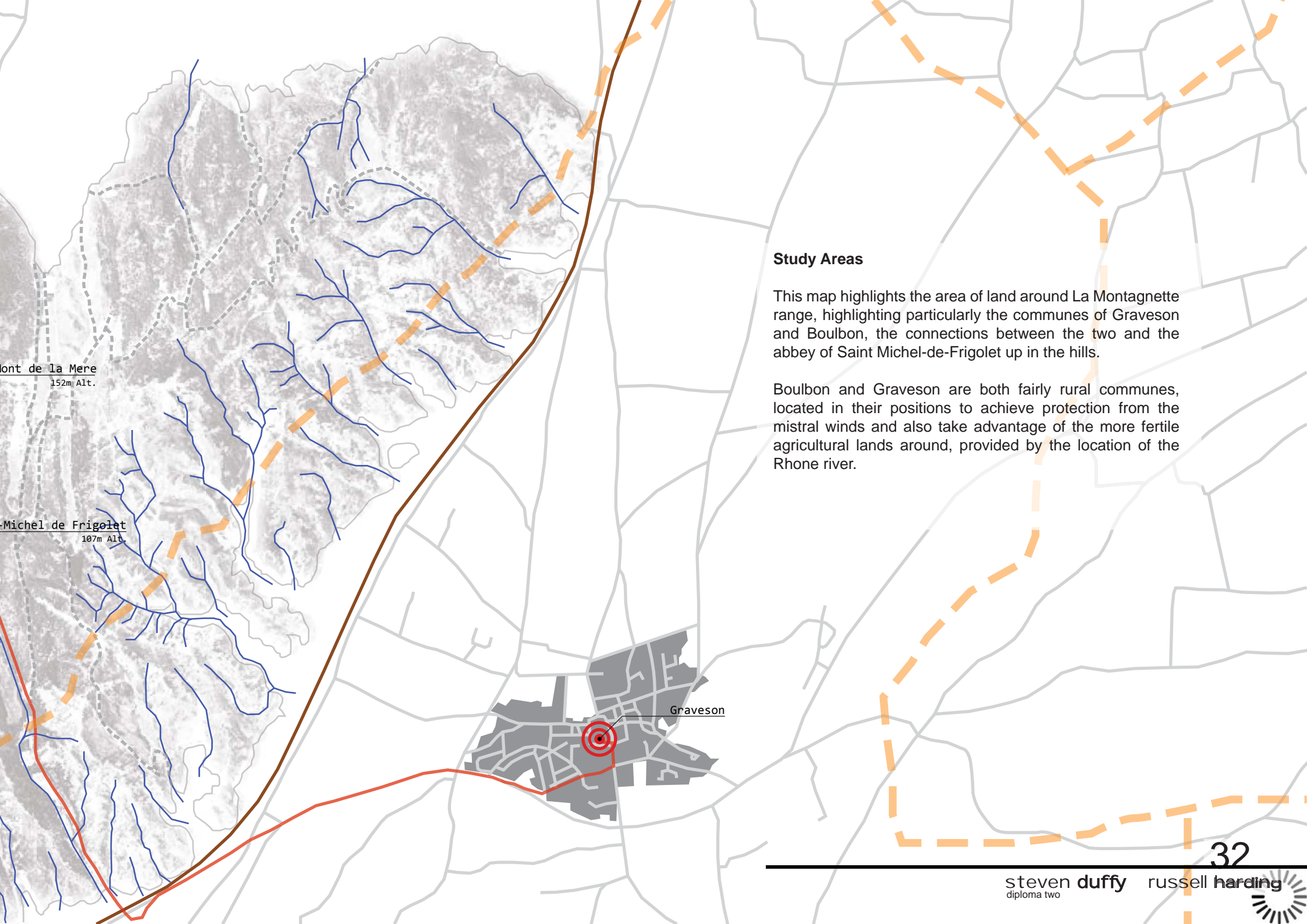
Abbaye de St.

Mourre Savoyard  
157m Alt.

Sau Salvador  
161m Alt.

31





### Study Areas

This map highlights the area of land around La Montagnette range, highlighting particularly the communes of Graveson and Boulbon, the connections between the two and the abbey of Saint Michel-de-Frigolet up in the hills.

Boulbon and Graveson are both fairly rural communes, located in their positions to achieve protection from the mistral winds and also take advantage of the more fertile agricultural lands around, provided by the location of the Rhone river.







### **La Montagnette Range**

The Montagnette a small hilly and mountainous range that covers an area of 6,000 hectares. The Montagnette lies across the communes of Boulbon, Graveson, Barbantane and Tarascon. It is in the Boulbon commune that it has its highest point; 167 meters above sea level at “Mount Raous” near the abbey of St. Michel-de-Frigolet.

The air in the Montagnette is very fragrant due to its typical Mediterranean plants, consisting primarily of; olive trees, green oaks, pistachios, hawthorn, jasmine and wild rosemary.

This picturesque range is popular with tourists with the abbey of St. Michel-de-Frigolet at the centre and the towns of Graveson and Boulbon which sit to either end of its base. This hilly landscape in the relatively flat Rhone delta gives the local area its own unique micro- climates, particularly effecting the mistral winds.

## Saint Michel-de-Frigolet Abbey

The Frigolet Abbey is located in the centre of the Montagnette range. It is located centrally between the communes of Graveson and Boulbon and religious services are still held in these parishes by the canons of the abbey.

The abbey is very distinct and visible today for its two grand towers which look across the Montagnette, however the abbey had a very unsettled history.

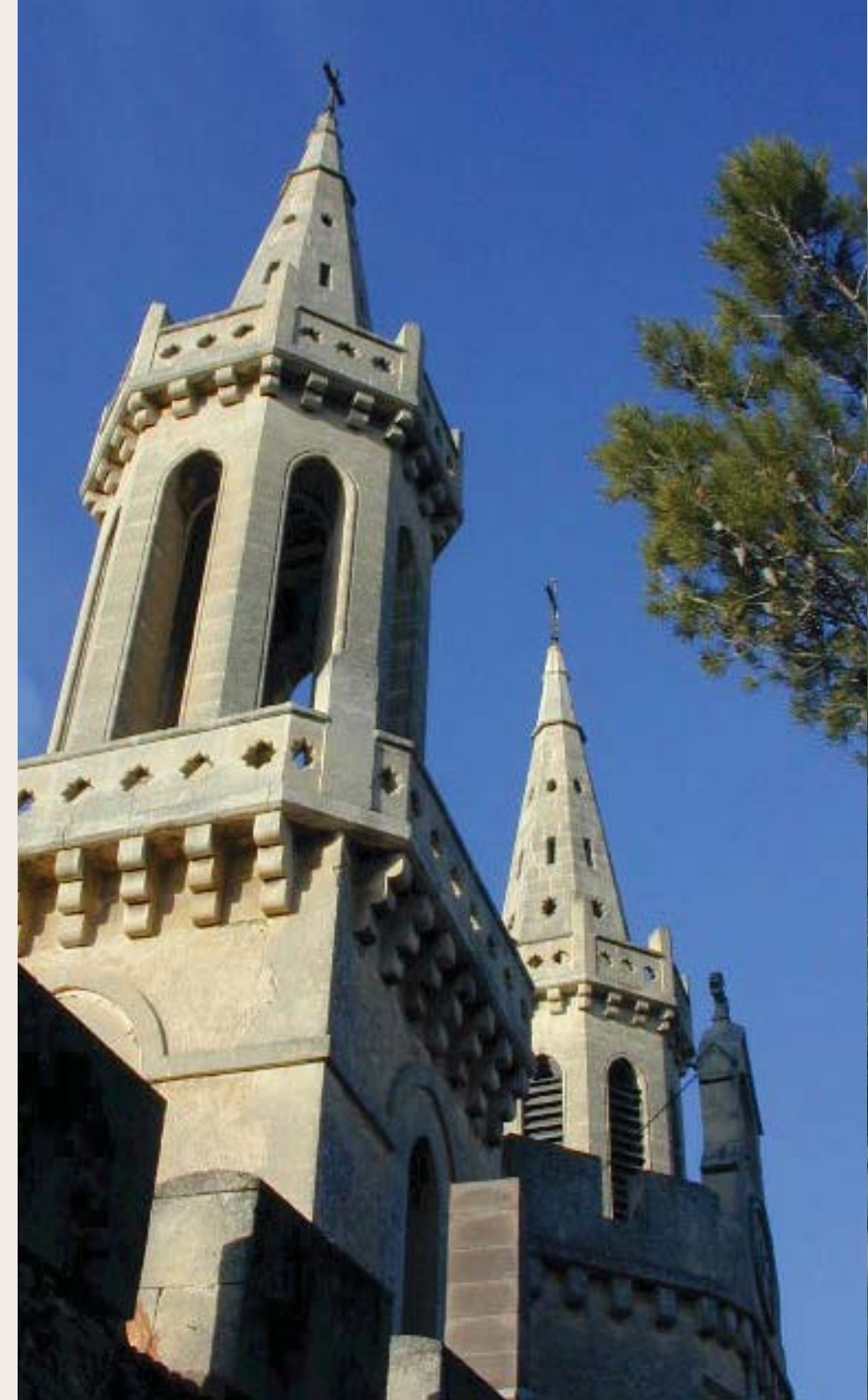
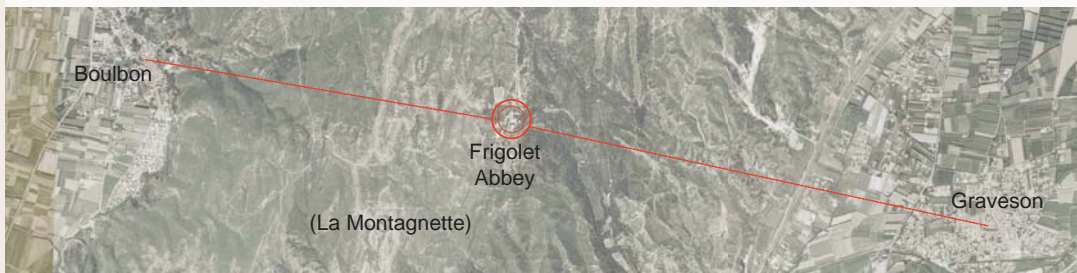
The monastery, dedicated to St. Michael, was founded around 960 by Conrad the Pacific, King of Arles. It was originally occupied by Benedictine monks. During the French Revolution, the property was sold off as a National Property and transformed into a boarding school.

In 1856 the Archbishop of Aix reclaimed possession of the abbey and in 1866 completed the building of the magnificent church which currently stands at the site.

In 1903, the anticlerical French Government policy led to the expulsion of the religious community at Saint Michel-de-Frigolet. The Canons finally refounded the current abbey in 1922.

Today, the abbey is a popular tourist destination in the Montagnette region, with its unique landscape and attractive local towns.

<http://www.net-provence.com/en/abbey-frigolet.htm>



Saint Michel-de-Frigolet Abbey



Boulbon-en-Provence



## Commune of Boulbon-en-Provence

Boulbon is a small commune in the Bouches-du-Rhône department in southern France and has a current population of approximately 1,555.<sup>1</sup>

Located between Avignon (15km North) and Tarascon (8km South,) it is nestled in a fold of La Montagnette, the land around Boulbon is divided between the fertile plain used for farming and La Montagnette, a paradise for walkers, mushroom gatherers and hunters.

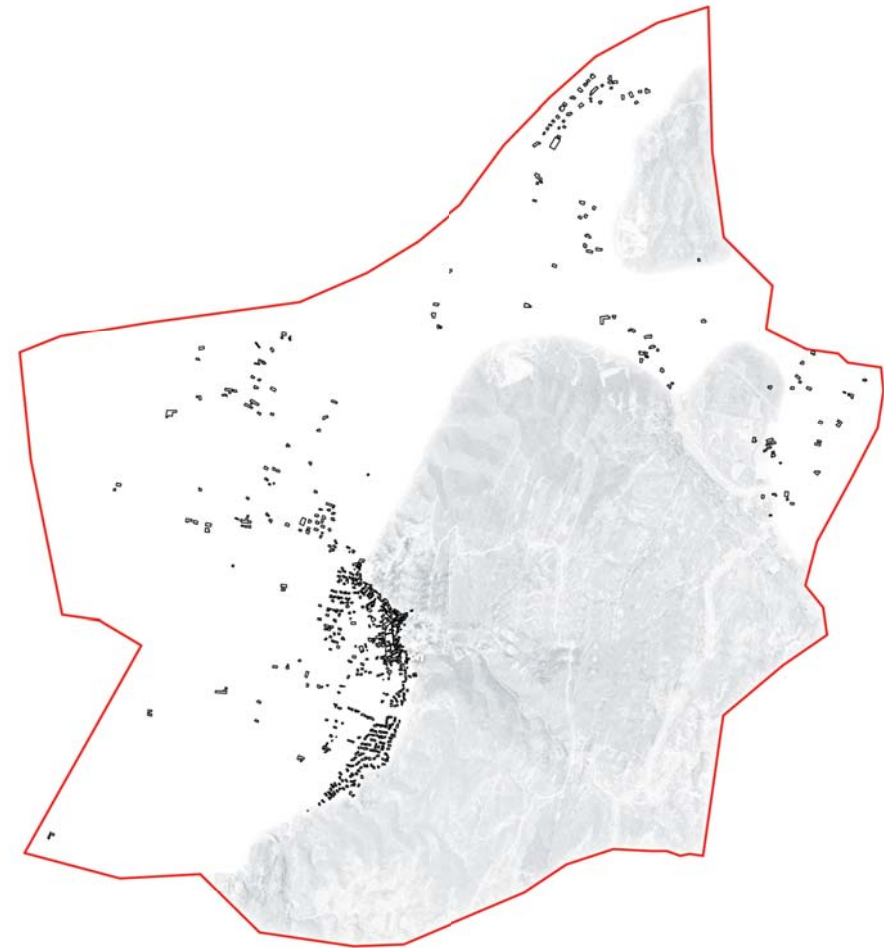
Boulbon is a mediaeval Provençal village. It has a fortified château which dominates the village and fortifications which protected it from attack. The town has two main access roads - one from the north that leads around the north side of La Montagnette and then over to the East to the Abbaye Saint-Michel de Frigolet and one from the south that leads past the Southern edge of La Montagnette towards Tarascon.

The town has two main sources of economy. The first and longest standing is agriculture, located close to the Rhône river the land to the West of Boulbon is very fertile. The second is tourism, with 3 annual events, a weekly market and walking, horse riding and mountain biking activities on the trails of La Montagnette the town appeals to a wide range of people.

However, due to the demands of tourism and also its location between Avignon and Tarascon the development of holiday homes, second homes and the ability to commute to the larger towns and cities is beginning to divide the town literally. The new development of these homes to the South of the original mediaeval development is isolated and has little interaction with the existing environment.

<sup>1</sup>. 1st Jan 2009 estimate from;  
<http://www.insee.fr/fr/ppp/bases-de-donnees/recensement/populations-legales/commune.asp?depcom=13017>

## Extent of Commune boundary



Graveson-en-Provence





## Commune of Graveson-en-Provence

Graveson is a traditional commune in the Bouches-du-Rhône department in southern France and has a current population of approximately 3,787.<sup>1</sup>

It lies just 2km south-east of the Montagnette mountains. Once a medieval walled, rural commune with its own castle at the heart, this small town has become a very quiet and non-descript place over the last decade.

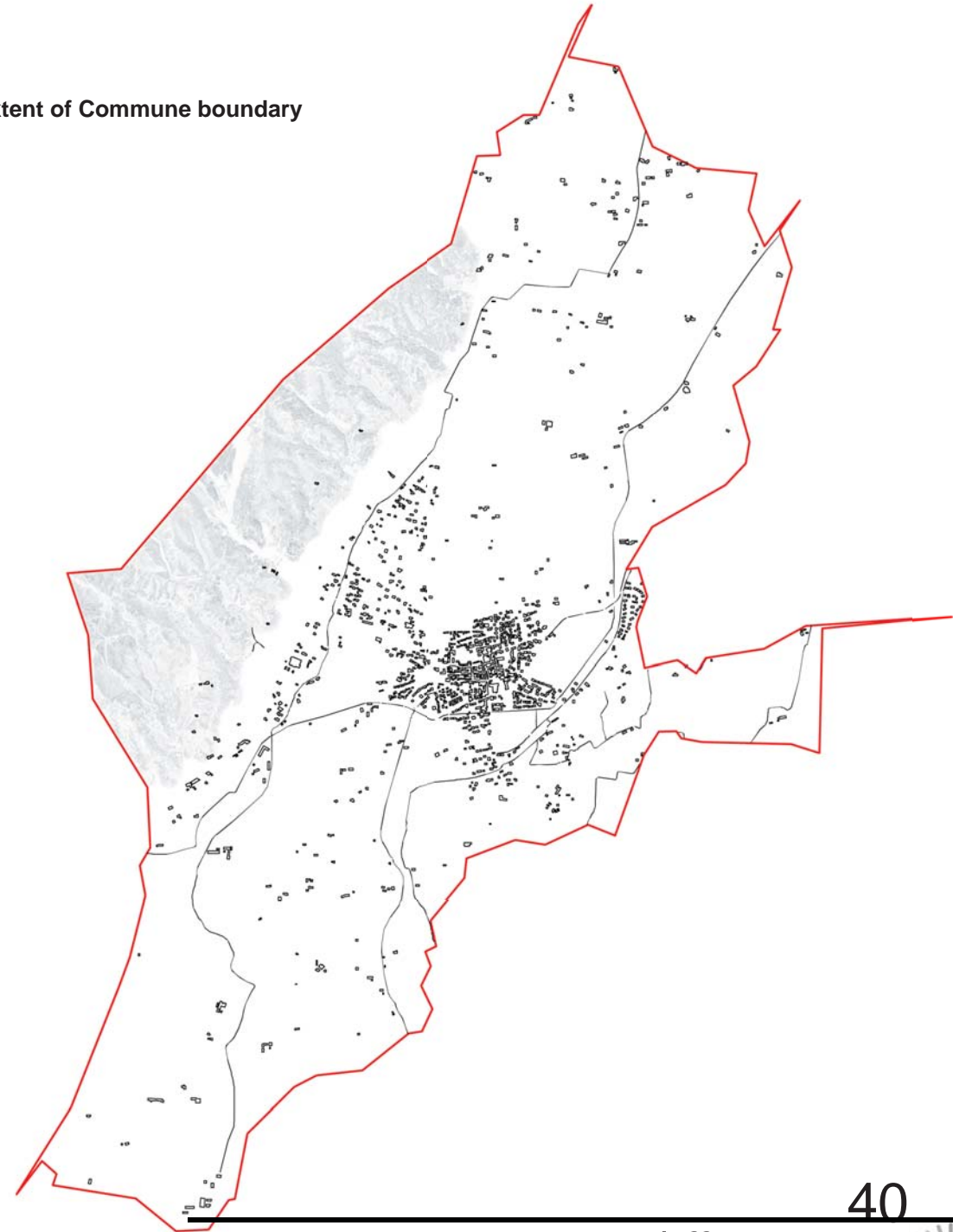
Its location between major French towns and its rural setting mean Graveson has become something of a commuter town with no real 'heart' to the community. The roads around the town get particularly busy but provide very good access to and from the town whilst creating a defined boundary to the town for future expansions, parking within the town is a serious issue.

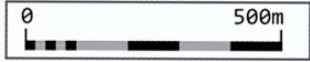
Graveson is not known as a tourist town in the region and therefore does not rely on an income from it, although perhaps because of this, there is very little for the people of the town to actually do. The numbers of social and cultural points within the town are very limited.

Many of the inner town streets are in need of some maintenance and repair works due to a lack of funding to the area, although new developments of commercial facilities have started to take place in the south-east area of the town, located very close to a number of schools.

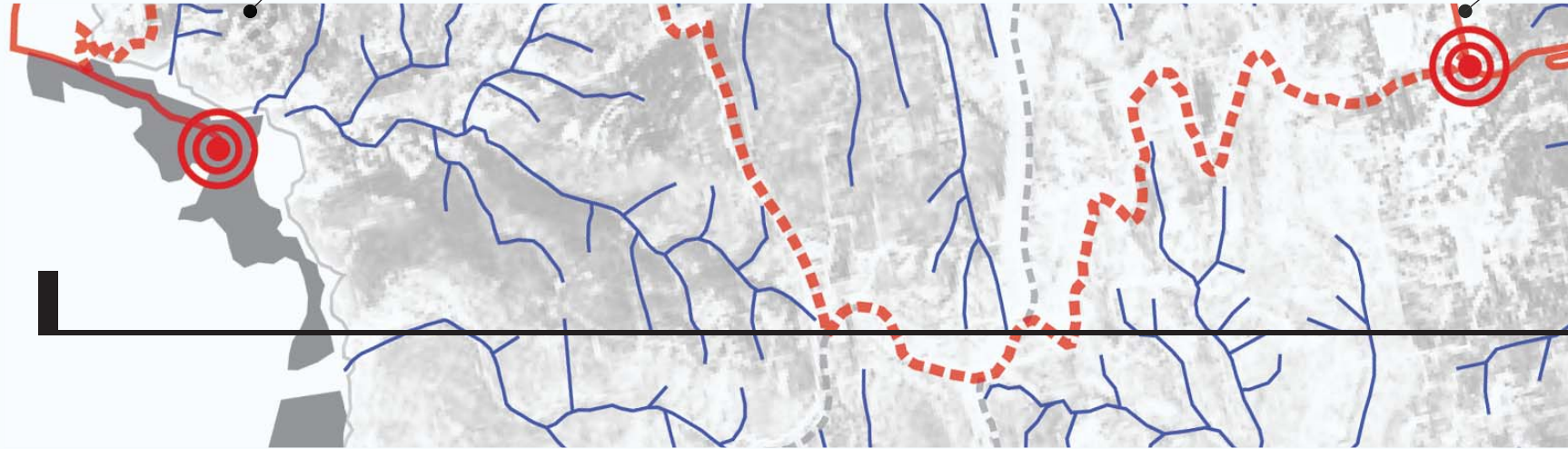
<sup>1</sup> 1st Jan 2009 estimate from:  
<http://www.insee.fr/fr/ppp/bases-de-donnees/recensement/populations-legales/commune.asp?depcom=13045>

## Extent of Commune boundary





Boulbon-en-Provence

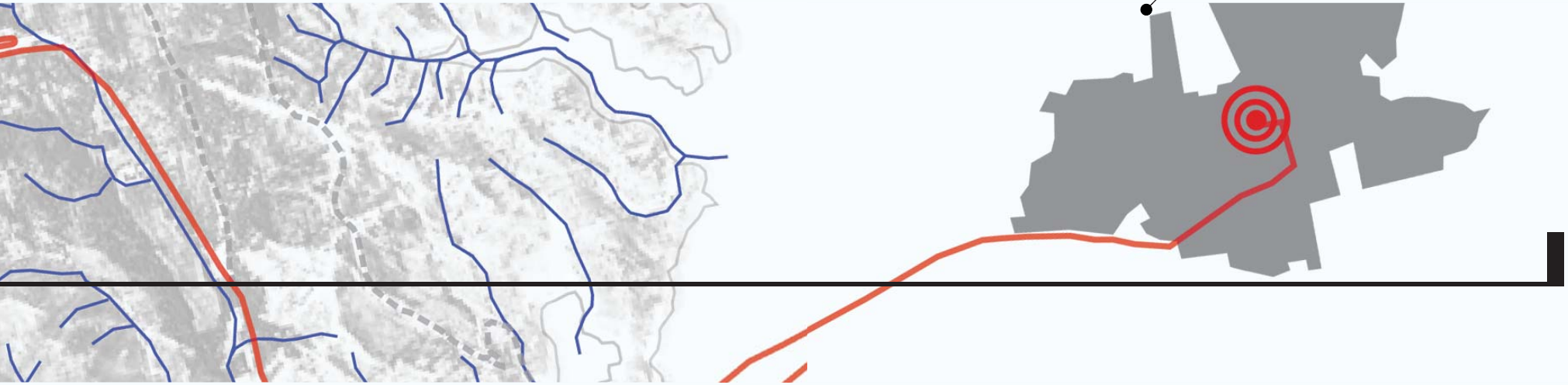


Boulbon-en-Provence



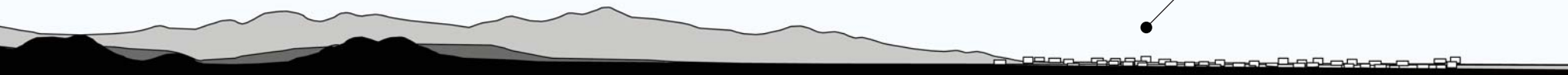
St Michel-de-Frigolet Abbey

Graveson-en-Provence



St Michel-de-Frigolet Abbey

Graveson-en-Provence



Topography through Study Areas

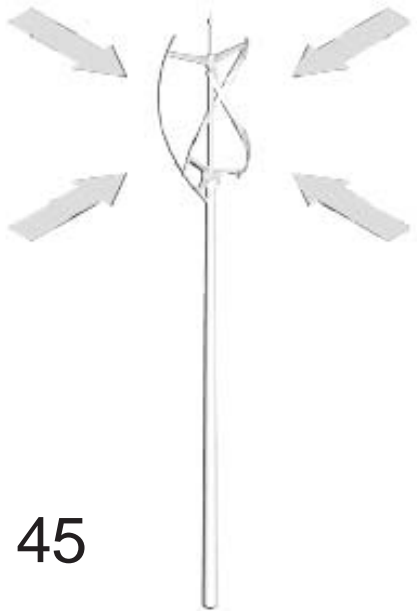








Unlike traditional HAWTs the quiet**revolution** VAWT uses wind from all directions without the requirement to track the wind, therefore maximising efficiency



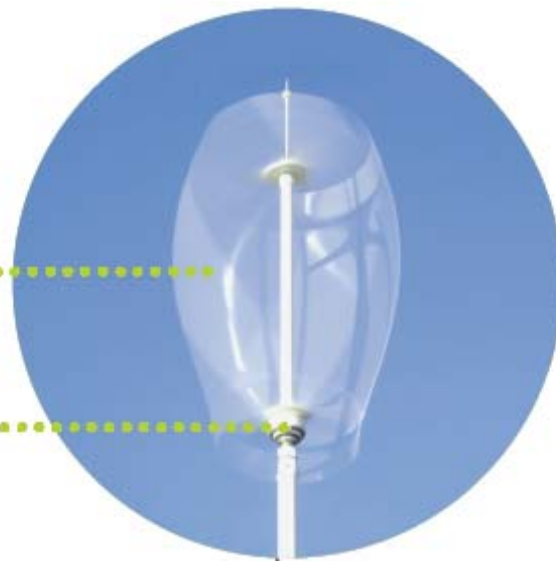
45

ROTOR

GENERATOR

MAST

FOUNDATION



KINETIC ENERGY FROM WIND



MECHANICAL ENERGY IN SPINNING ROTOR



ELECTRICAL ENERGY FROM GENERATOR



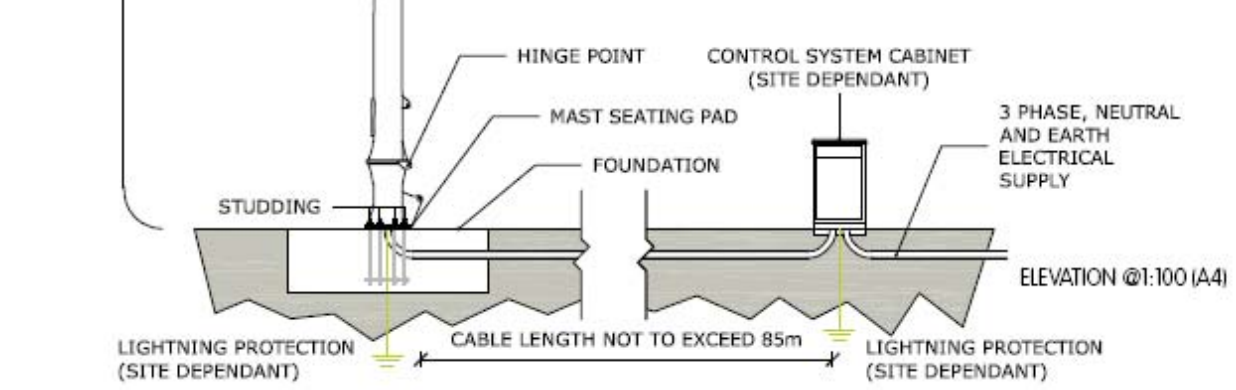
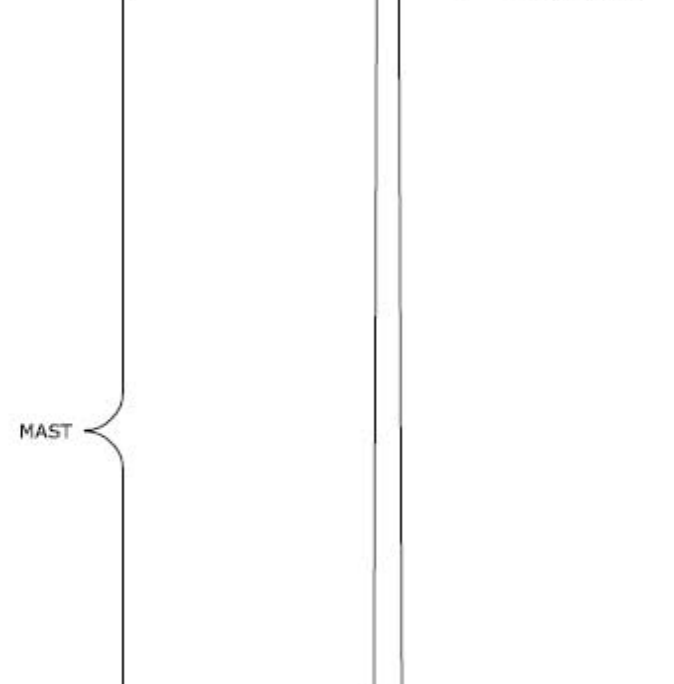
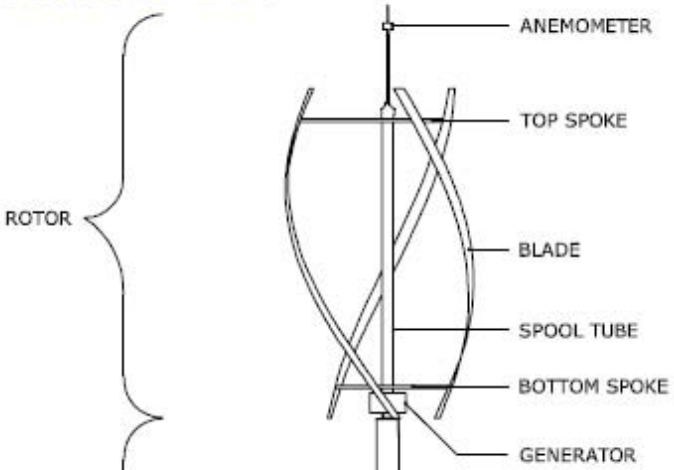
USABLE ELECTRICAL ENERGY ON-SITE

CONTROL ELECTRONICS

USABLE ELECTRICAL ENERGY



# SETTING OUT



GENERATOR	Direct-drive permanent magnet synchronous generator integrated into the base of the rotor
POWER	The peak power at 14m/s is 7.4kW aerodynamic   6.2kW DC The BWEA rated power at 11m/s is 4.2kW aerodynamic   3kW DC  (N.B. when comparing turbine ratings please ensure that the windspeeds are like for like. Alternative manufactures may not quote at the BWEA rating windspeed, therefore comparisons should be made using the power curve)
OUTPUT	5,000 - 11,000 kWh per year (site wind dependant)

## ENERGY

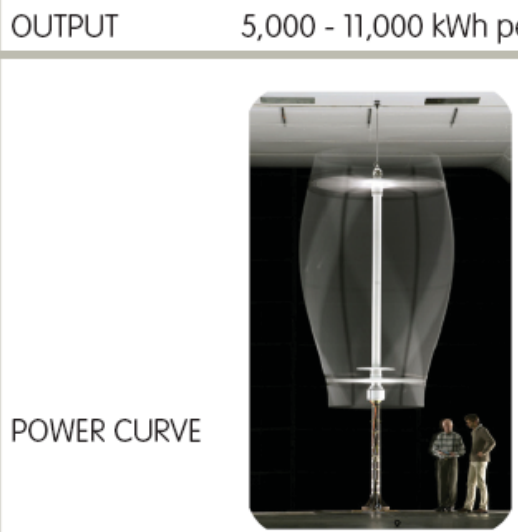
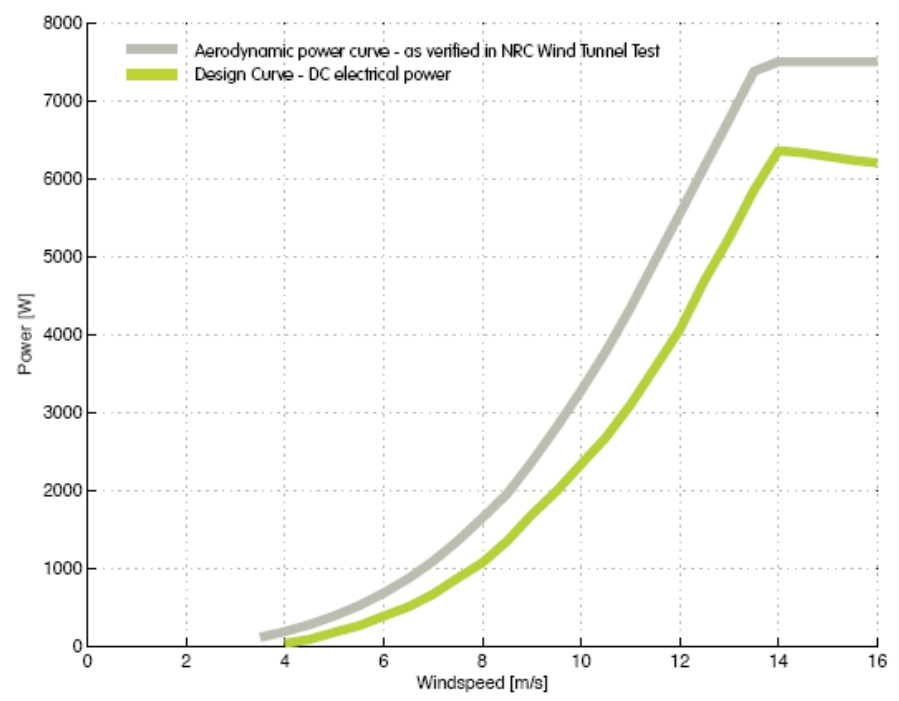
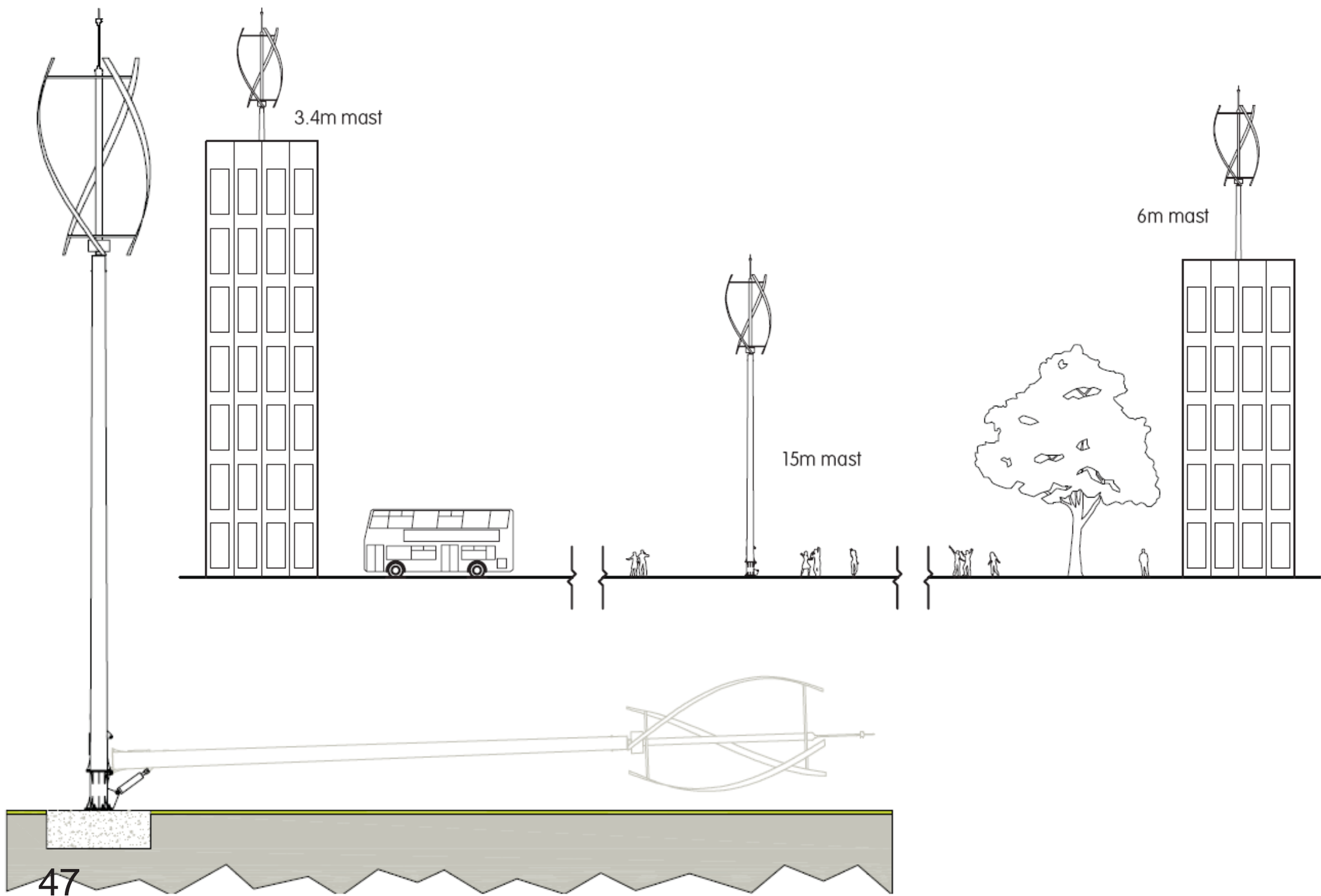


Image of qr5 during aerodynamic wind tunnel testing at the National Research Council of Canada (NRC)

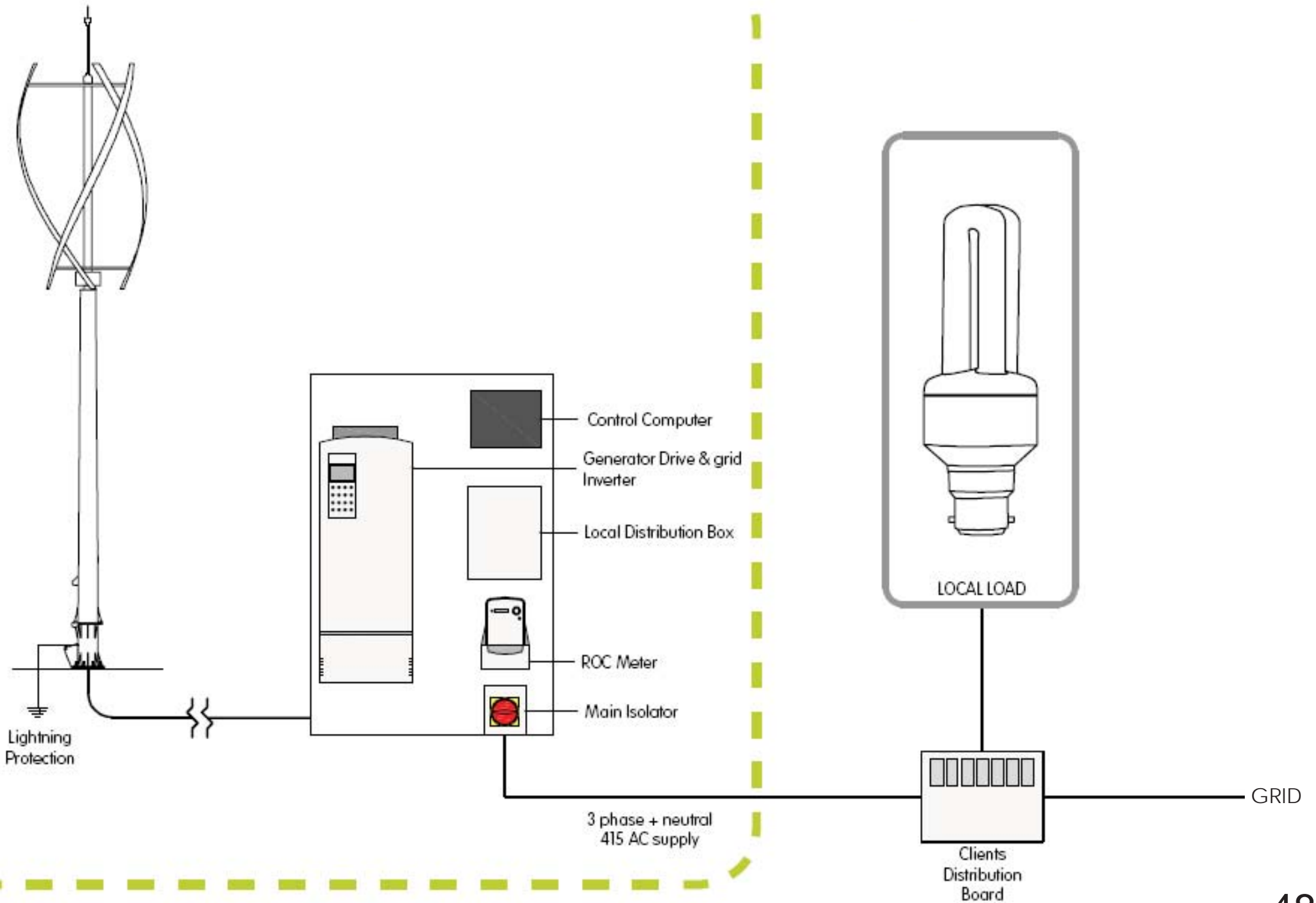




Ground Mount Diagram

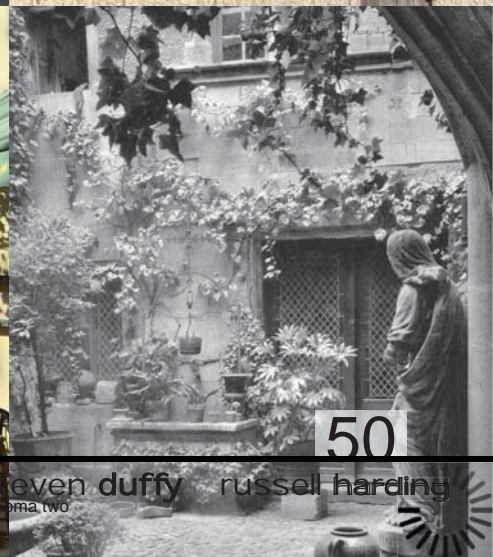


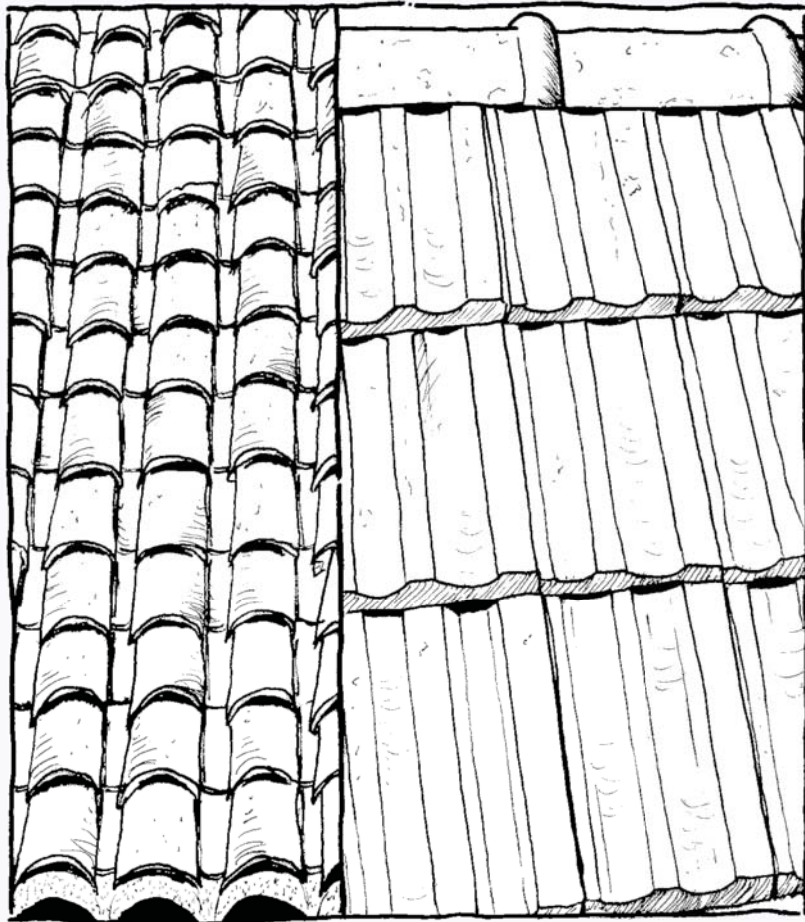
Supplied and installed by quietrevolution





Local Characteristics and Materials

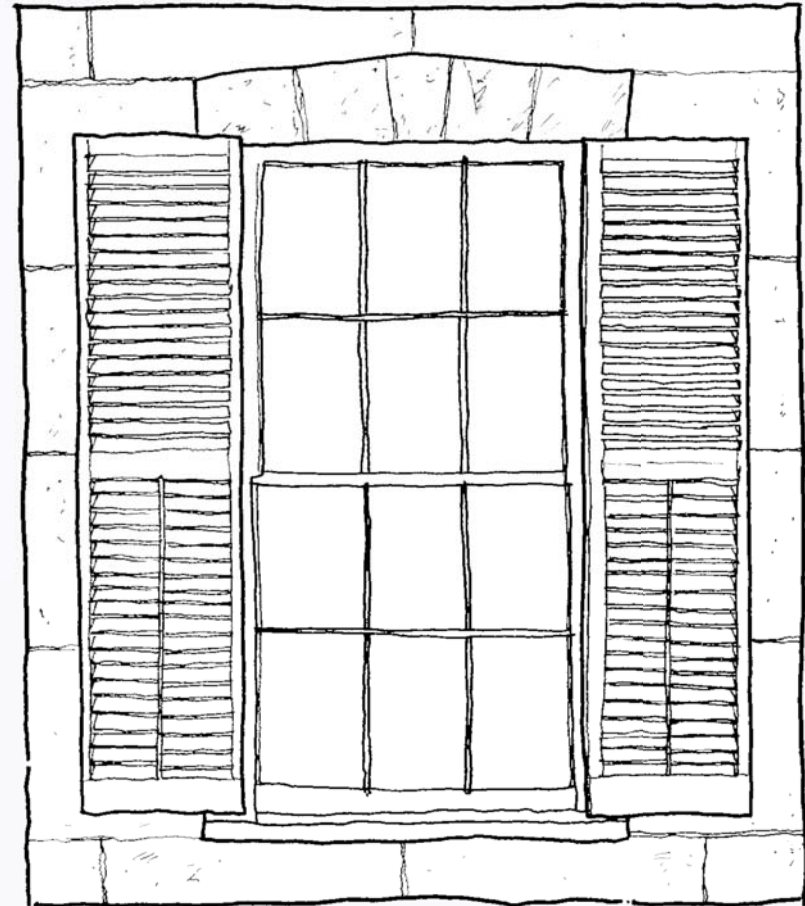




**Roofing:**

Typically roofs are pitched and covered with traditional terracotta Mediterranean tiles. This is a style very similar across the whole of the Mediterranean region.

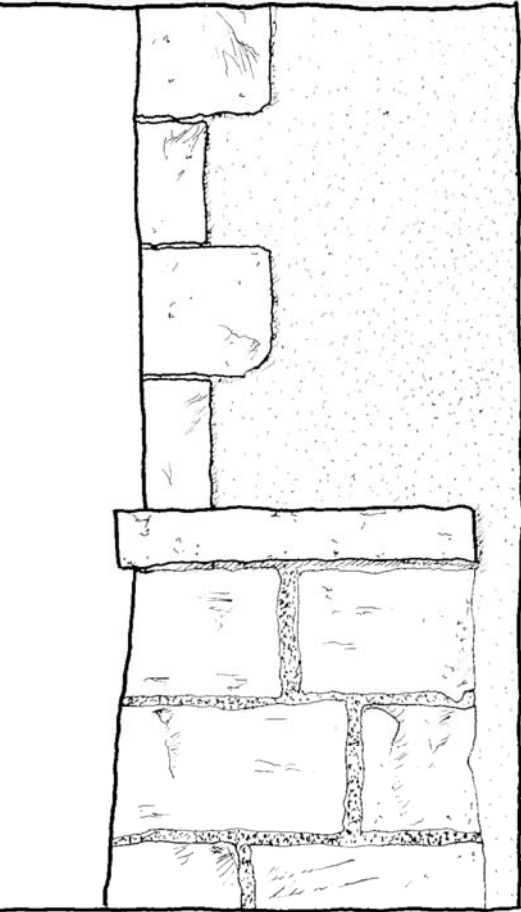
Somenewerdevelopmentsoftenusethe slightly cheaper and newer interlocking terracotta tiles (shown on the right above) which from a distance gives a similar finish effect.



**Window Openings:**

Windows tend to be quite small and punched through the thick stone work around this region. Windows are kept to a minimum facing the north-west due to the Mistral wind, southern facing windows are kept small to reduce solar heat gain.

Wooden shutters are a common feature on these local openings.

**Materials:**

Local stone is very common, as is rendered concrete blockwork. Often corners and lintels are left exposed revealing the nature of the materials. Colours are usually fairly light, pastel and traditional to help reflect the sun's heat.

**Door Thresholds:**

Down many of the typical, traditional streets doors open directly onto the road/pathway with a simple step-up into the building. Like the window openings, doorways tend to be simple 'punches' through the external walls.

Doorways are often sheltered by a simple canopy to provide solar shading and protection from possible rainfall.

**Local Planting:**

Many of the roads and public spaces in this area of southern France are lined with trees.

Often Plane trees, which provide a lot of shade in the summer from the sun, but are very woody and allow sunlight to pass through to these spaces in the winter months.

View from La Montagnette



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- Johnson, H., The World Atlas of Wine, London: Mitchell Beazley Publishers, 1971.
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- <http://www.net-provence.com/en/abbey-frigolet.htm>
- <http://zoover.co.uk/france/provence-alps-french-riviera/st-remy-de-provence-bouches-du-rhone/weather>
- <http://www.tgv.co.uk/Default.aspx?tabid=1127>
- [http://www.tourisme.gouv.fr/fr/z2/stat/tis/att00018288/TIS\\_EVE2007\\_2008-5.pdf](http://www.tourisme.gouv.fr/fr/z2/stat/tis/att00018288/TIS_EVE2007_2008-5.pdf)

