MAPC🌐DE

The human face of coordinates

A Short Address for Any Location on Earth

Kewal Shienmar
Managing Director
Mapcode Foundation

What is an Address?

Name

House Number

Street Name

City

What is an Address?

Name

House Number

Street Name

City, State

Country

What is an Address?

Name

Company

House Number

Street Name,

Floor, Apartment

City, State

Country

The Problem with Addresses

Having It

Less than 50% of the dwellings on Earth have a street name or house number

Finding It

Where *is* the " Machakos" Village"?

Where is "Kethemboni Road"?

Where is "number 127" on that road

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Not Having it = Not Finding it

Kareem Abdullah
Pharmacist
Kareem's Chemist
Likoni
Kenya
Tel. +254356247643

Three miles east along the A14 Likoni-Ukunda national road, turn left past the petrol station on the right. Pharmacy is next to the greengrocers store.

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The Solution: Coordinates

Having It

Every place on Earth has a coordinate. Almost every phone can show it (even without a signal!)
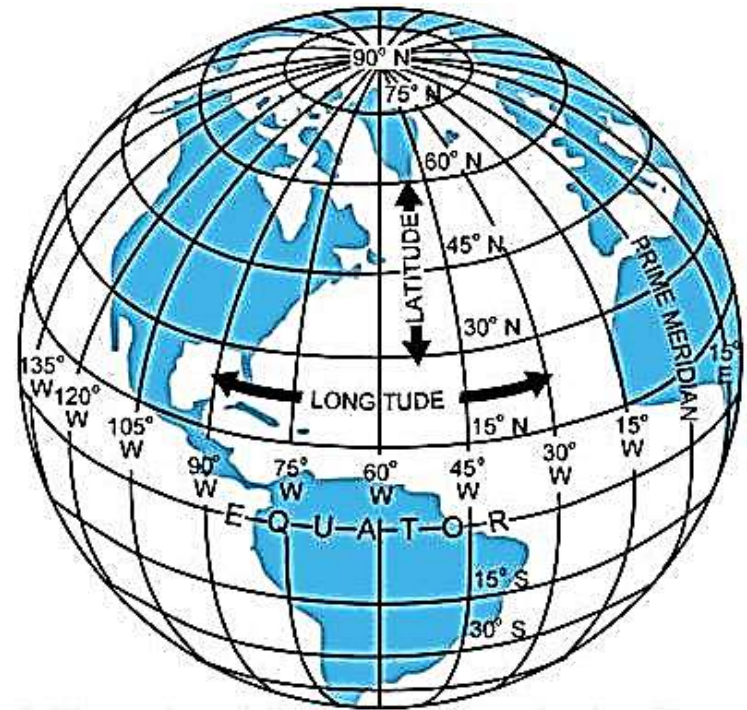
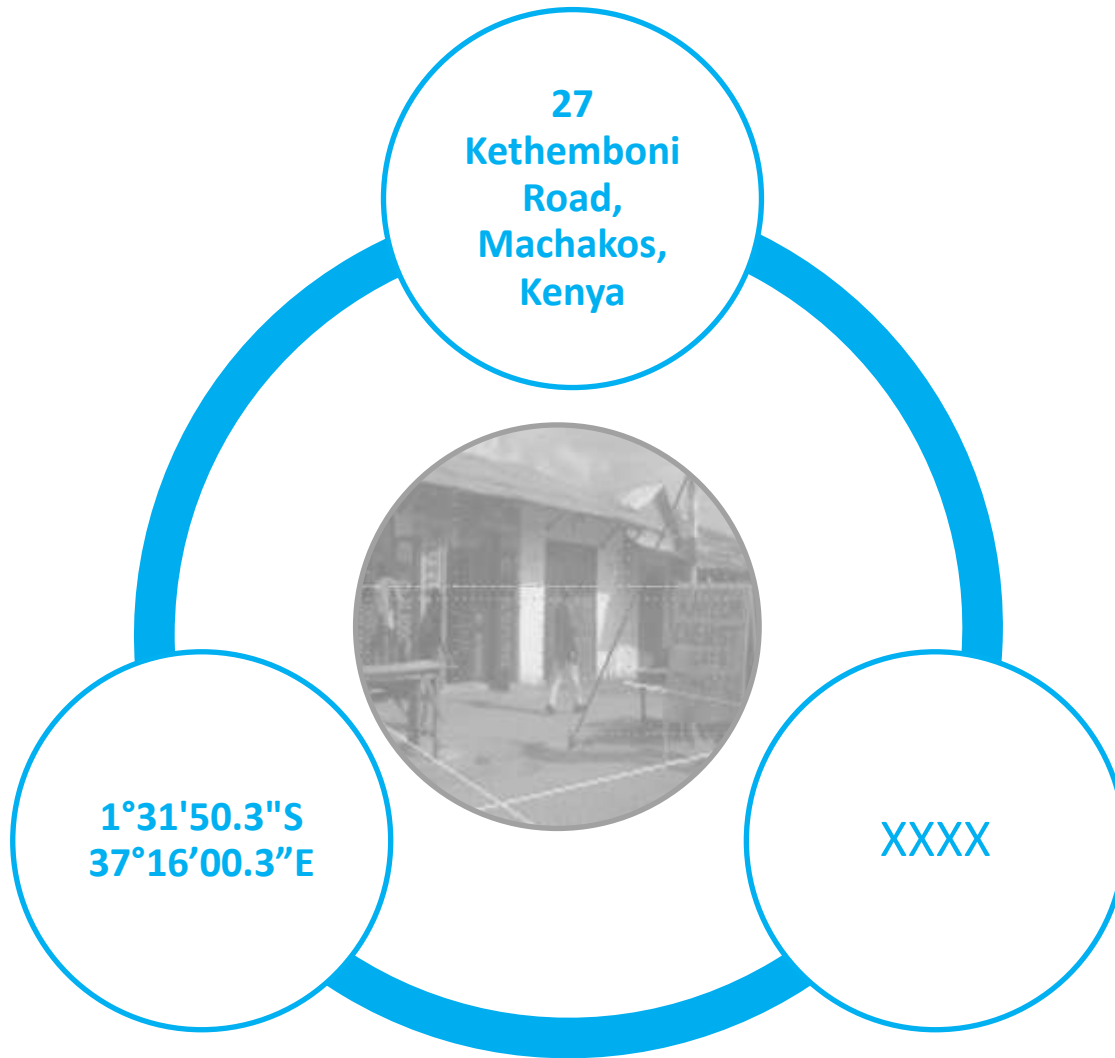## Finding It

The coordinate **says** where the place is

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Coordinates

1°31'50.3"S 37°16'00.3"E

(3,5 meter precision)

Long, Complicated

Techy & Nerdy

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The Solution: Codes

27
Kethemboni
Road,
Machakos,
Kenya

1°31'50.3"S
37°16'00.3"E

XXXX

FULL ADDRESS:

Kethemboni Road
Machakos
Kenya

V

1°31'50.3"S 37°16'00.3"E

V

XXXX

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The Solution: Codes

Database System

Each location is manually *assigned* a code

Grid System

Any coordinate can automatically be converted into a code, and vice verse

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What is a Mapcode?

A very **short** code

Consisting of **digits** and **letters,** separated by a **dot**

Defining a **location** on Earth

Accurate to within a **few meters**

Any Location on Earth

Any Location on Earth

Any Location on Earth

Any Location on Earth

Any Location on Earth

Kenya
4NSR.27T

MAPCODE

What is a Mapcode?

The best possible **grid** system

The most **user-friendly** system

Free, open source, unbranded

Widely **supported**

MAPCODE

Underlying Mapcode Principal

There is a conversion from longitude/latitude to mapcode (and vice versa)

Every location has a mapcode within a context (e.g. "Lisbon, Portugal")

Centro de Congressos de Lisboa
Praça Indústrias
1300-307 Lisboa
Portugal

Longitude/latitude:
38.698912, -9.183404

Mapcode in Portugal
PRT 4Y.GW

Mapcode for latitude/longitude 38.698912, -9.183404:

Portugal (PRT)
PRT 4Y.GW
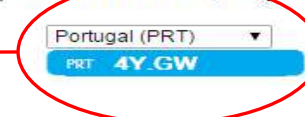
A New Standard

MAPCODE

- A standard for representing locations
- designed for public, every-day use.
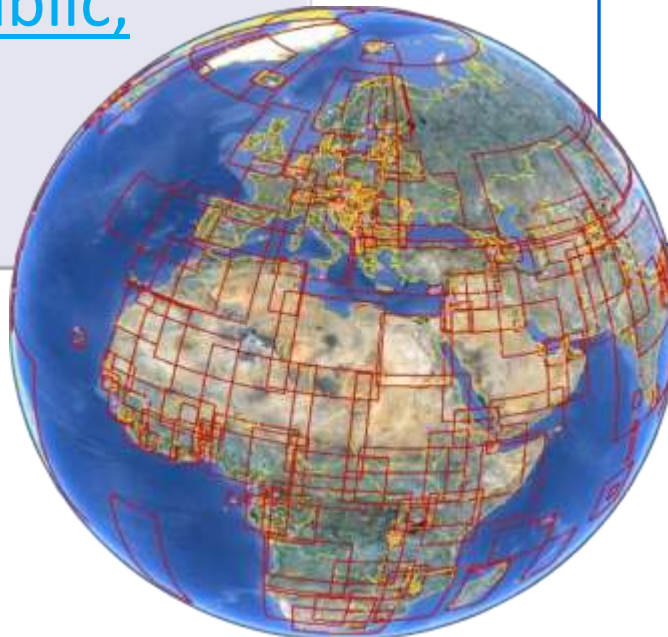
Unlike other standards:

- *general* (WSG84 etc.)
- *3D* (UTMz etc.)
- *military* (MGRS etc.)
- *local* (British National Grid etc.)

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Context Makes for Shorter Codes

In order to achieve a 5m precision:

- locations anywhere on Earth need at most **9** characters

- locations anywhere in small countries need at most **6** characters

note: humans always know the country context

In the USA, India etc. they always known the *state* context

MAPCODE

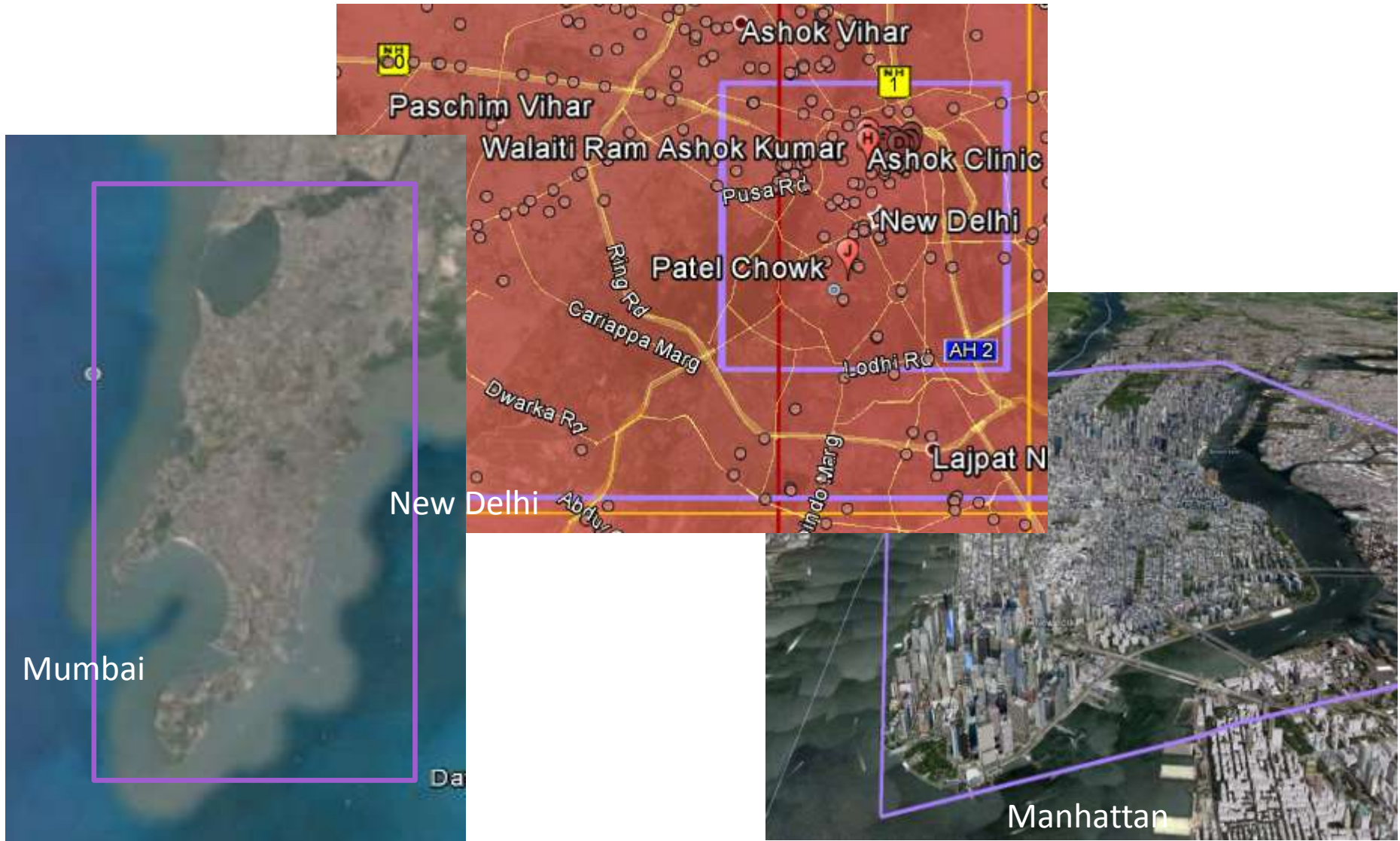# Variable Code Length

Codes need **not** all be the **same length**

Short Codes for High Density Areas

Short codes reserved for areas of high population density

- Majority of population has a short mapcode
- The data table covers thousands of the largest large cities on earth

Persons per square mile

- Over 520
- 260–519
- 130–259
- 25–129
- 1–24
- 0
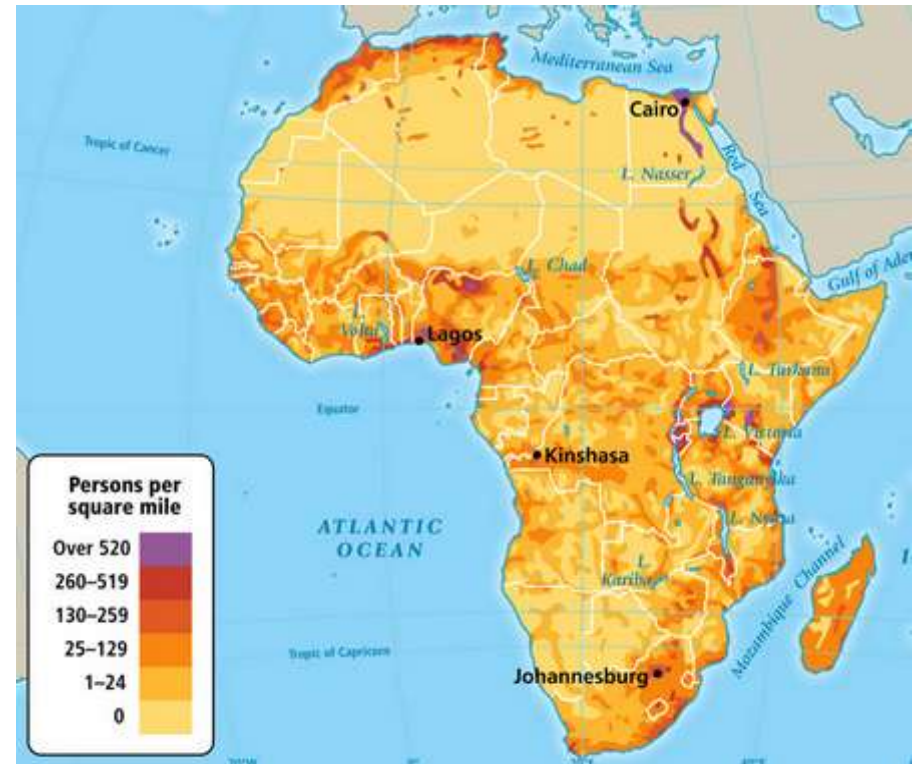
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4 characters for the Highest-Density Areas

Mumbai

New Delhi

Manhattan

Precise Enough

Mapcodes are precise enough for human, everyday use

- The territory is divided into cells of at most 10 by 10 meters
- A location is always in one of those cells
- A mapcode indicates the center of a cell
- Locations are at most 5m (2½m on average) of such a center (a mapcode)

More Precise & Flexible

5m precision is usually *more* **precise** (and **flexible**) than an address

People can pick the location they wish to associate with their address

- The main entrance
- The car park

Mapcodes are independent of map data, so not affected by map problems

- e.g. house number interpolation problems

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What is Covered?

31 Character basis

100 km^2 areas: AB.CD	Densely populated cities, especially capital cities
6,000 km^2 areas: AB.CDE	Very large cities and conglomerates
250,000 km^2 areas: ABC.DEF	Small countries, states, collections of highly populated conglomerates
5,000.000 km^2 areas: ABCD.EFG	Enormous countries (USA, China, Russia…)
The World ABCDE.FGHI	The World (including oceans)

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An Algorithm Containing a Table

An algorithm includes a large data table

The mapcode system defines a simple conversion

The conversion uses a data table (16,000 rectangles)

Every territory and every major population center on Earth

*Note: this **used** to be unheard-of. Nowadays wishing cards come with polyphonic music recordings*

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Recognizable

Mapcodes are easily recognized
(like emails, websites or phone numbers)

- Website: www.mapcode.com
- Email: info@mapcode.com
- Phone: +31 20 557 5801
- Mapcode: DK7.C9T

Mapcodes do not look like words or numbers

- Mix of consonants and digits (no vowels)
- No all-digit codes exist

Also important for search box support!

Easy to Communicate Verbally

Mapcodes are easy to communicate

- **short**
- **case-insensitive**
  - *No "capital W lowercase h"*
- **no vowels**
- **dot-separated**
  - *Like websites and emails*
- **symbol-free**
  - *Ampersand, degree-symbol, forward slash*

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Unambiguous

Mapcodes are unambiguous

- Every location on Earth has a mapcode
  - *usually, several mapcodes!*

- A mapcode represents **one** location
  - *within a context!*

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Easy to Remember

Mapcodes are easy to remember

- mapcodes are <u>short</u>
- the context need seldom be stated
- When codes are longer, neighbourhoods usually share the same prefix

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International

Foreign alphabet support

- easy to **write**
  (few strokes, no accents)
- easy to **type**
- easy to verbally **communicate**
- **unambiguous**
  (H in Roman, Greek, Cyrillic)
- no **vowels**
  (where possible)

HPRV.1234	Roman
ぢՇՊ⅃.1234	Armenian
চতদব.১২৩৪	Bengali
HPЯЧ.1234	Cyrillic
Ћ╋ЧС.1234	Georgian
HPΨΦ.1234	Greek
ਟਨਭਲ.੧੨੩੪	Gurmukhi
חמצ.1234	Hebrew
टनभल.१२३४	Hindi
サヒヘモ.1234	Katakana
ຊ຅ມ຺.1234	Lao
ฌธผล.๑๒๓๔	Thai

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A-Political

Mapcodes are a-political

- The data table covers all known territories on Earth
  - *and with very wide margins*

- Every location also has an "international" mapcode
  - *always 9 characters*
  - *context less, a-political*
  - *covers international waters, e.g. oil-rigs*

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A Natural Part of the Address

Kareem Abdullah
Pharmacist
Kareem's Chemist
Kenya
KEN **QX6.XJ4**

Tel. +254356247643

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Kenya

40,000,000 people

1,000,000 km2 → 7 characters

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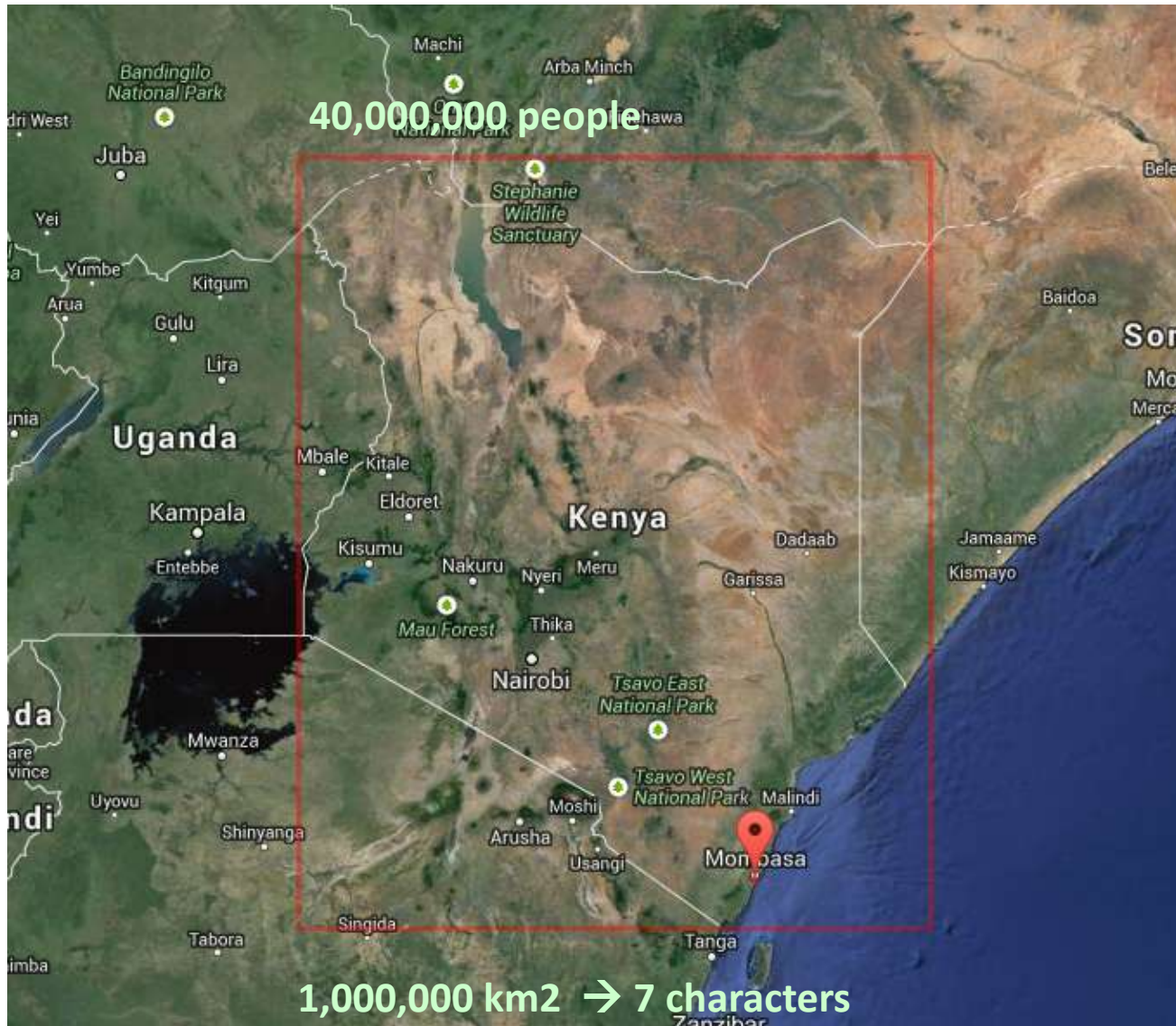
The first two letters:

30x35 km areas

Area QX

Kenya QX**.***

Area **QX**

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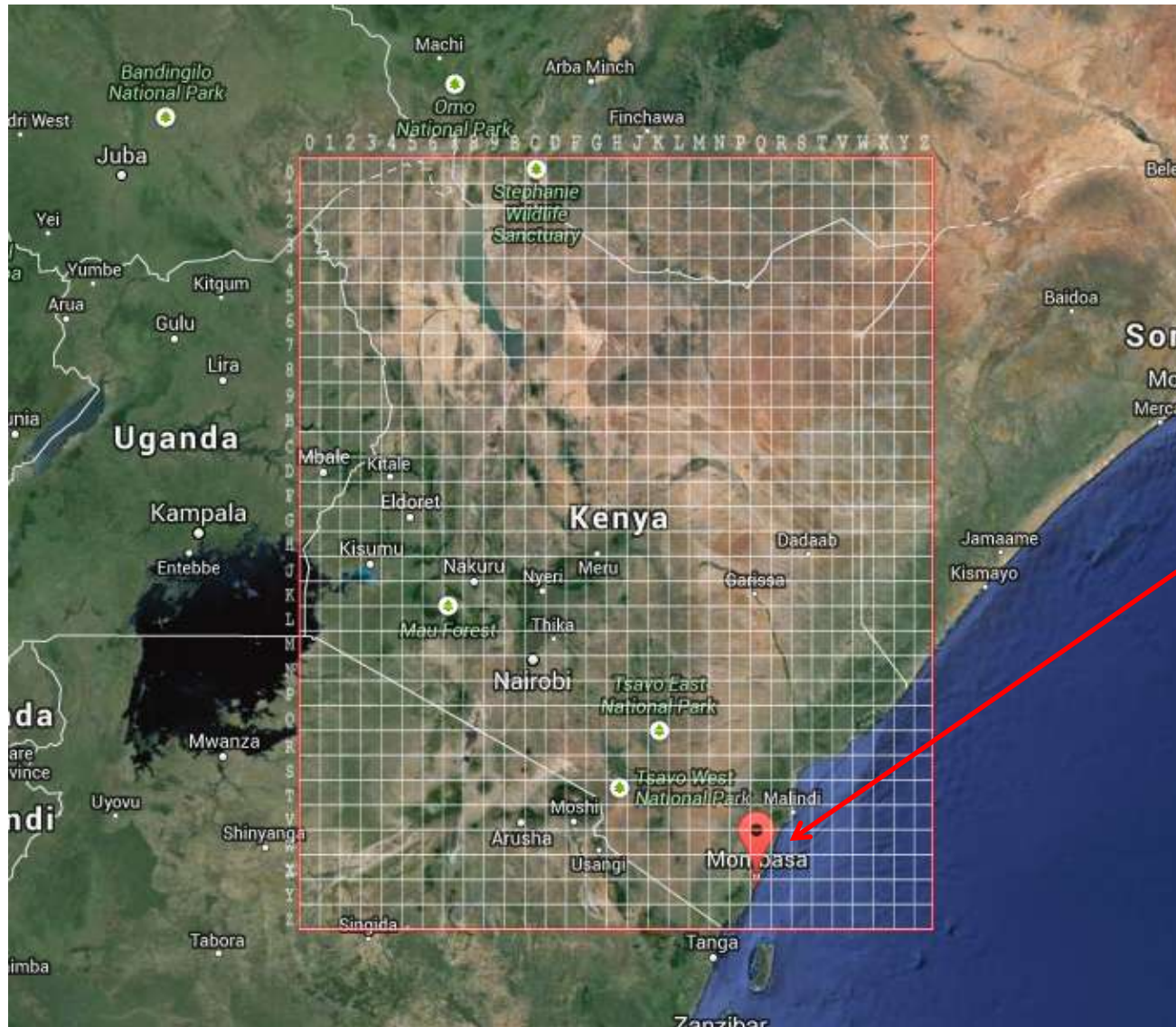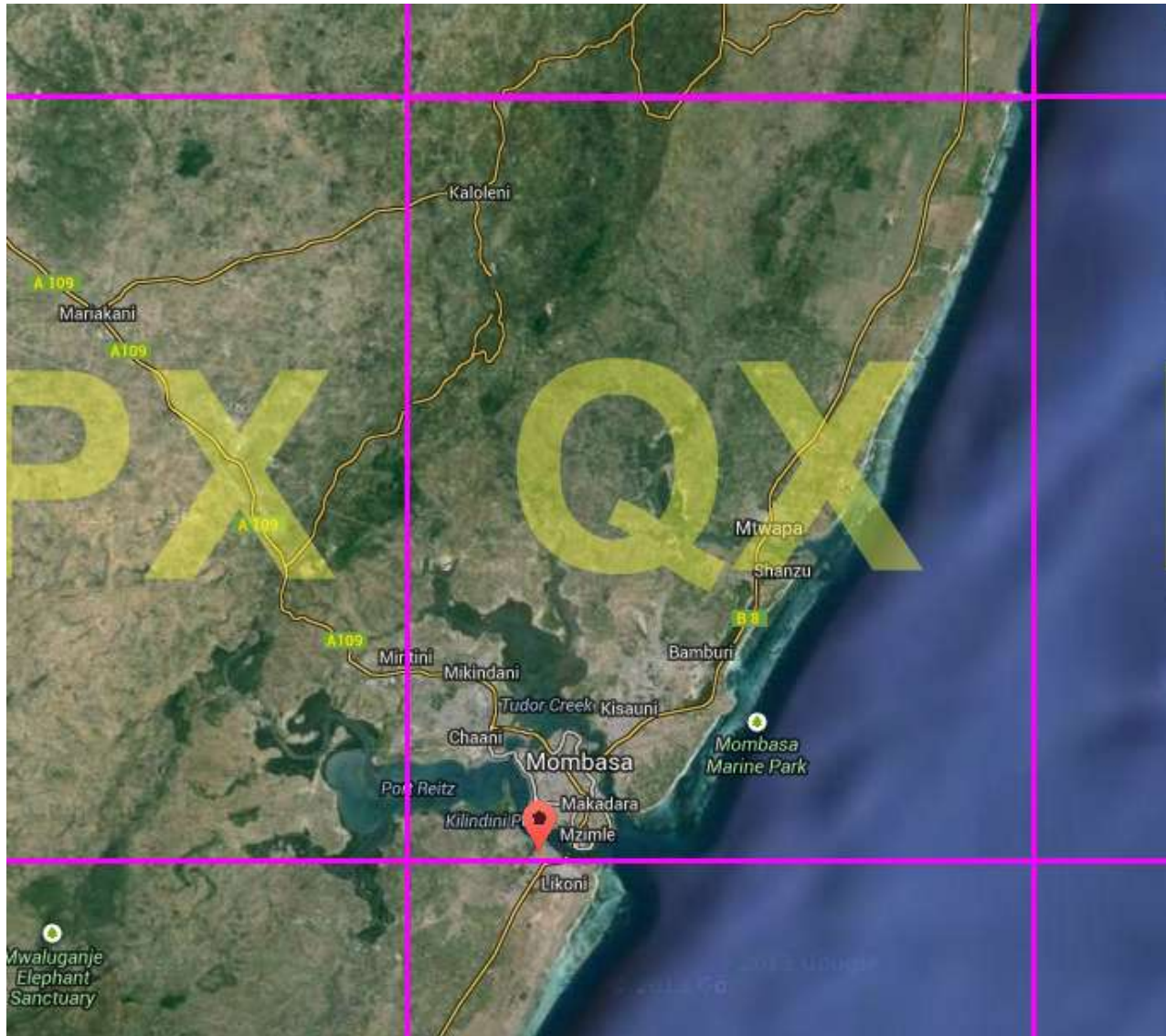
The next two letters:

Area **QX**
Subarea **6Z**
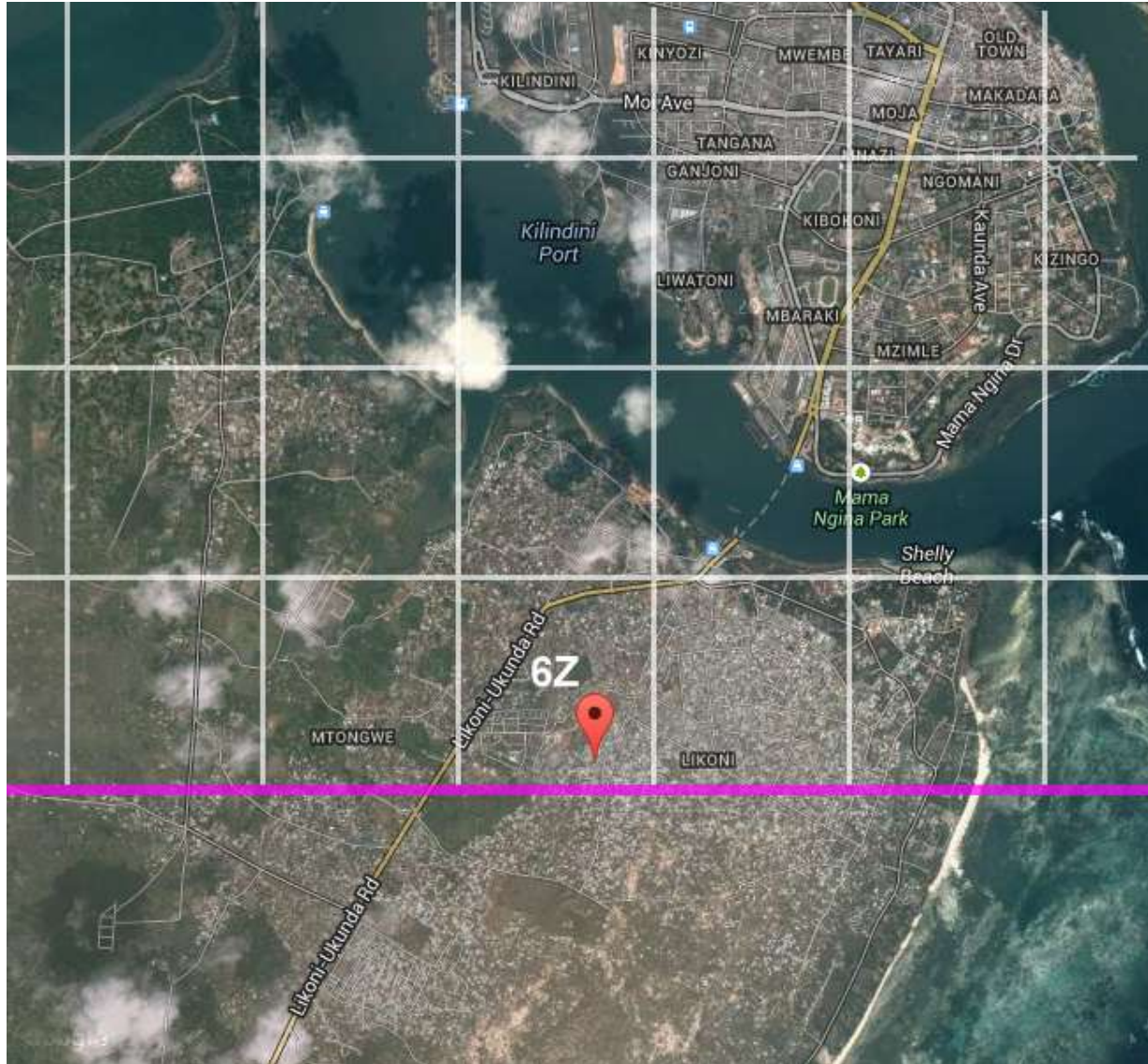
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Kenya QX6Z.***

Area **QX**
Subarea **6Z**

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Kenya QX6Z.***

Area **QX**
Subarea **6Z**

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Kenya QX6Z.X**

Area **QX**
Subarea **6Z**
Cell **X**

MAPCODE

Kenya QX6Z.X**

Area **QX**
Subarea **6Z**
Cell **X**

MAPC⊕DE

Kenya QX6Z.X**

Area **QX**
Subarea **6Z**
Cell **X**

MAPC☉DE
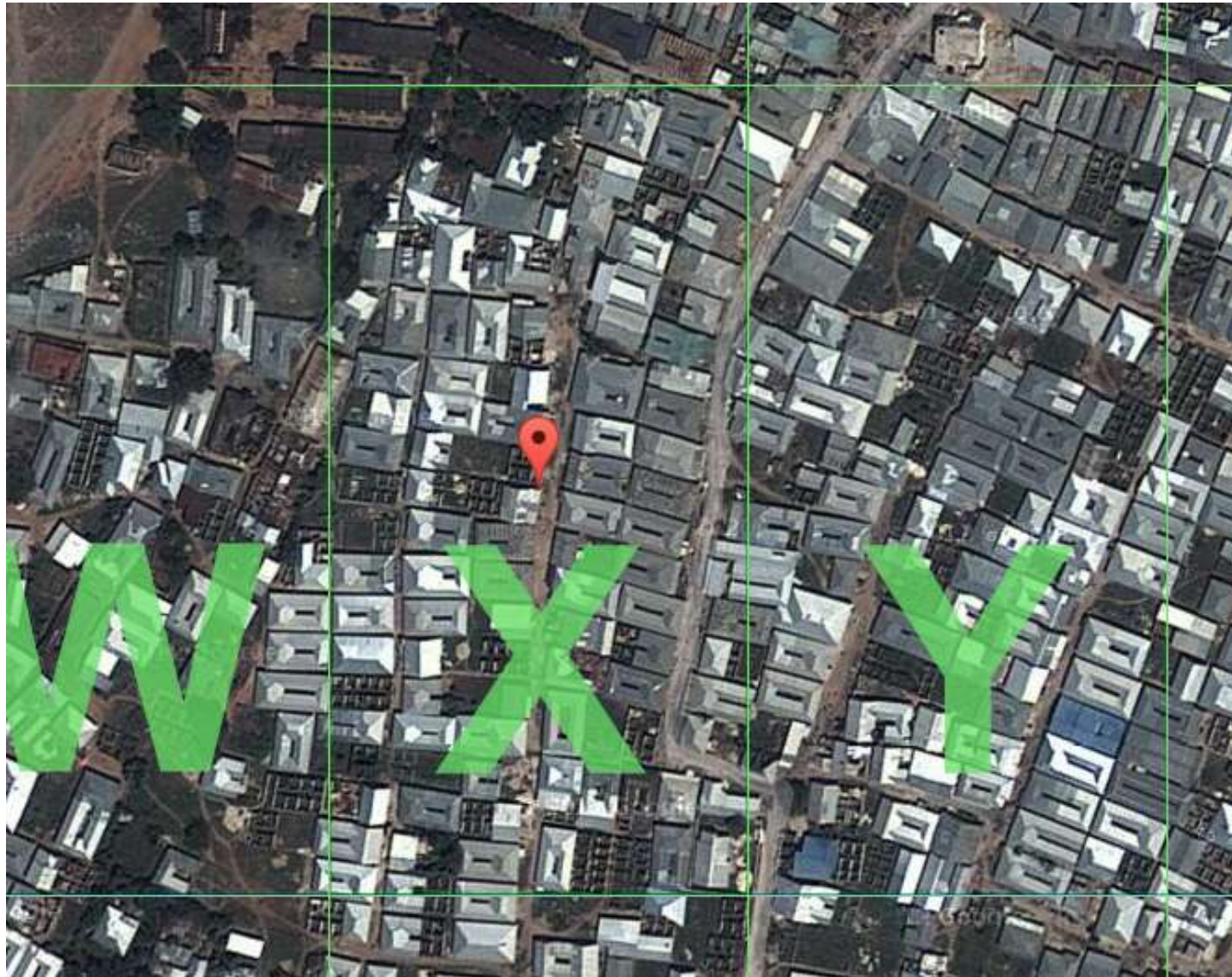
Kenya QX6Z.XJ3

Kareem Abdullah
Pharmacist
Kareem's Chemist
Kenya **QX6Z.XJ4**

Area **QX**
Subarea **6Z**
Cell **X**
Location **J4**
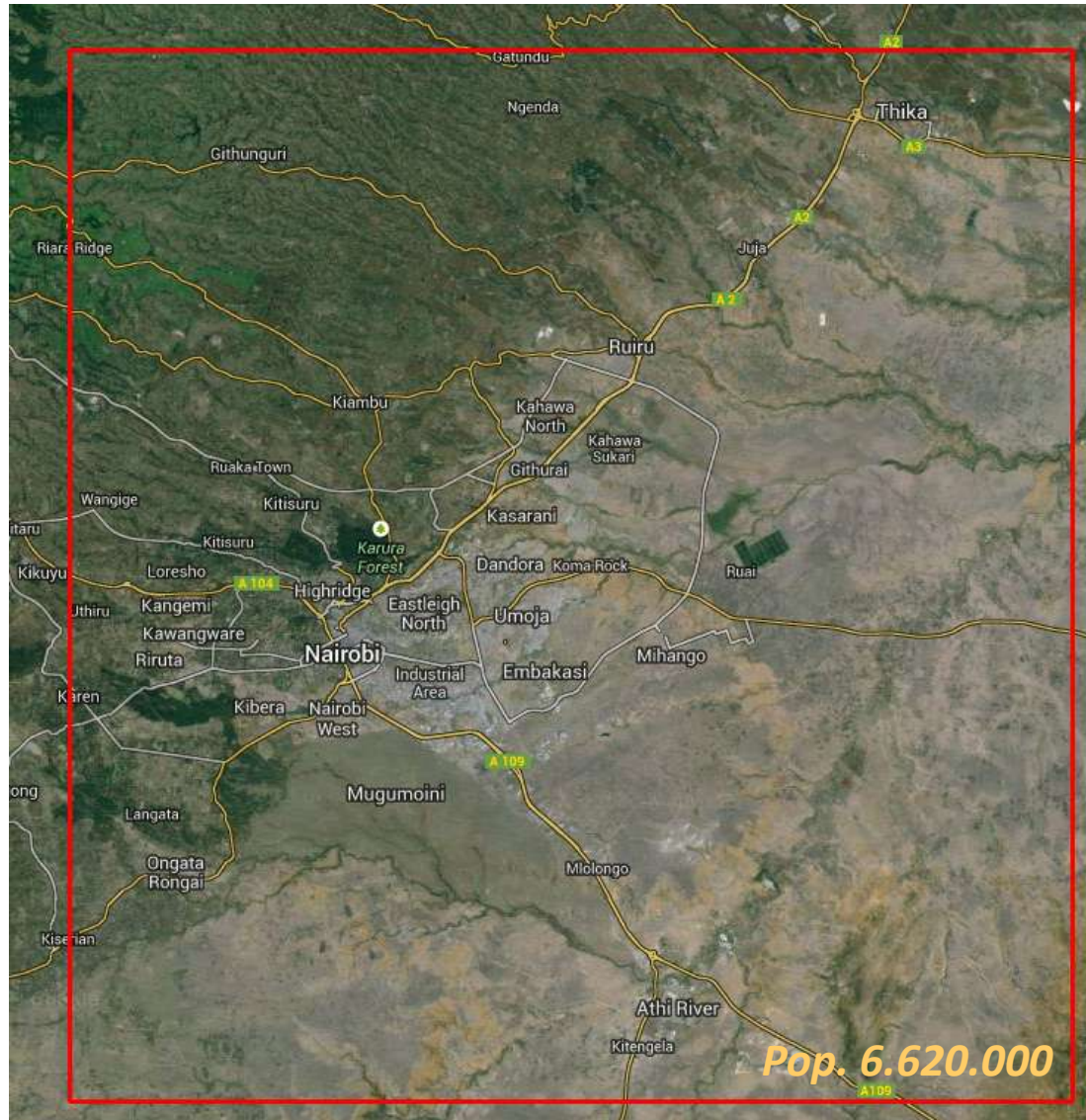
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3,000 km² around Nairobi

15% of population lives in this area

Pop. 6.620.000

MAPCODE

3,000 km² around Nairobi

15% of
population
lives in this area

Divided into
about 1000
areas
of 3 km² each

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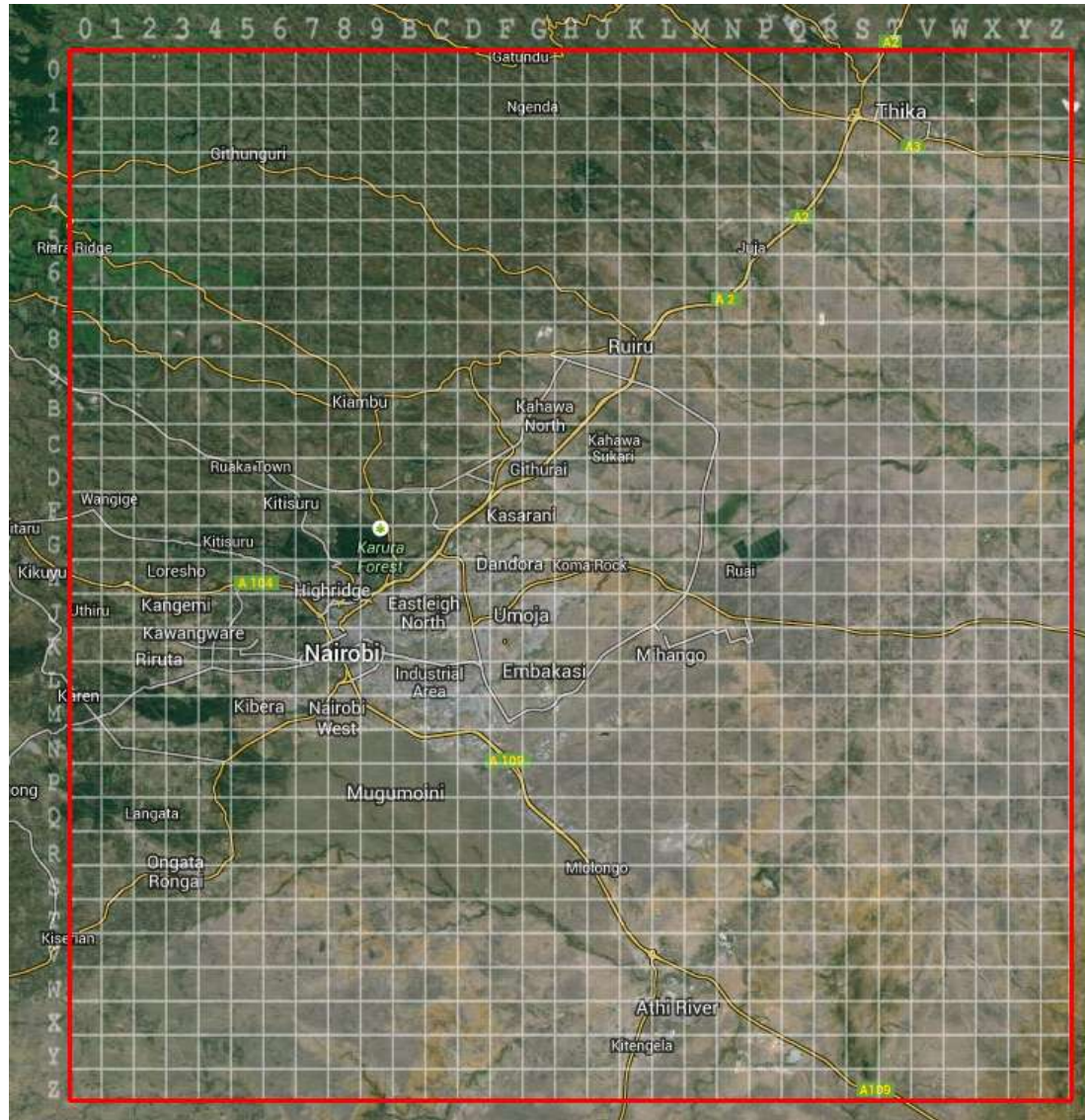
J9.XXX

15% of
population
lives in this area

Divided into
about 1000 areas
of 3 km² each

e.g. Ruiru in
area J9

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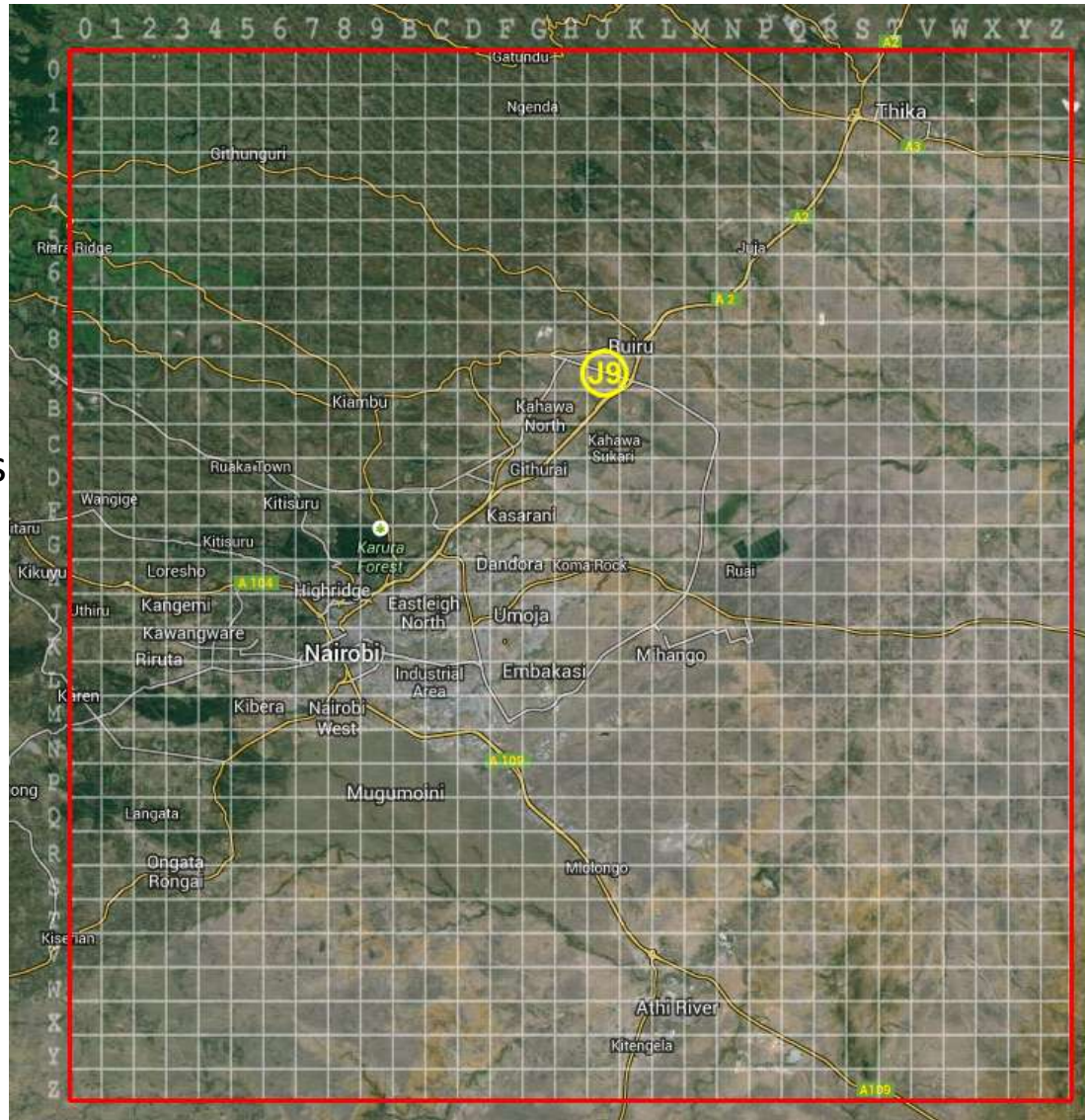
3,000 km² around Nairobi
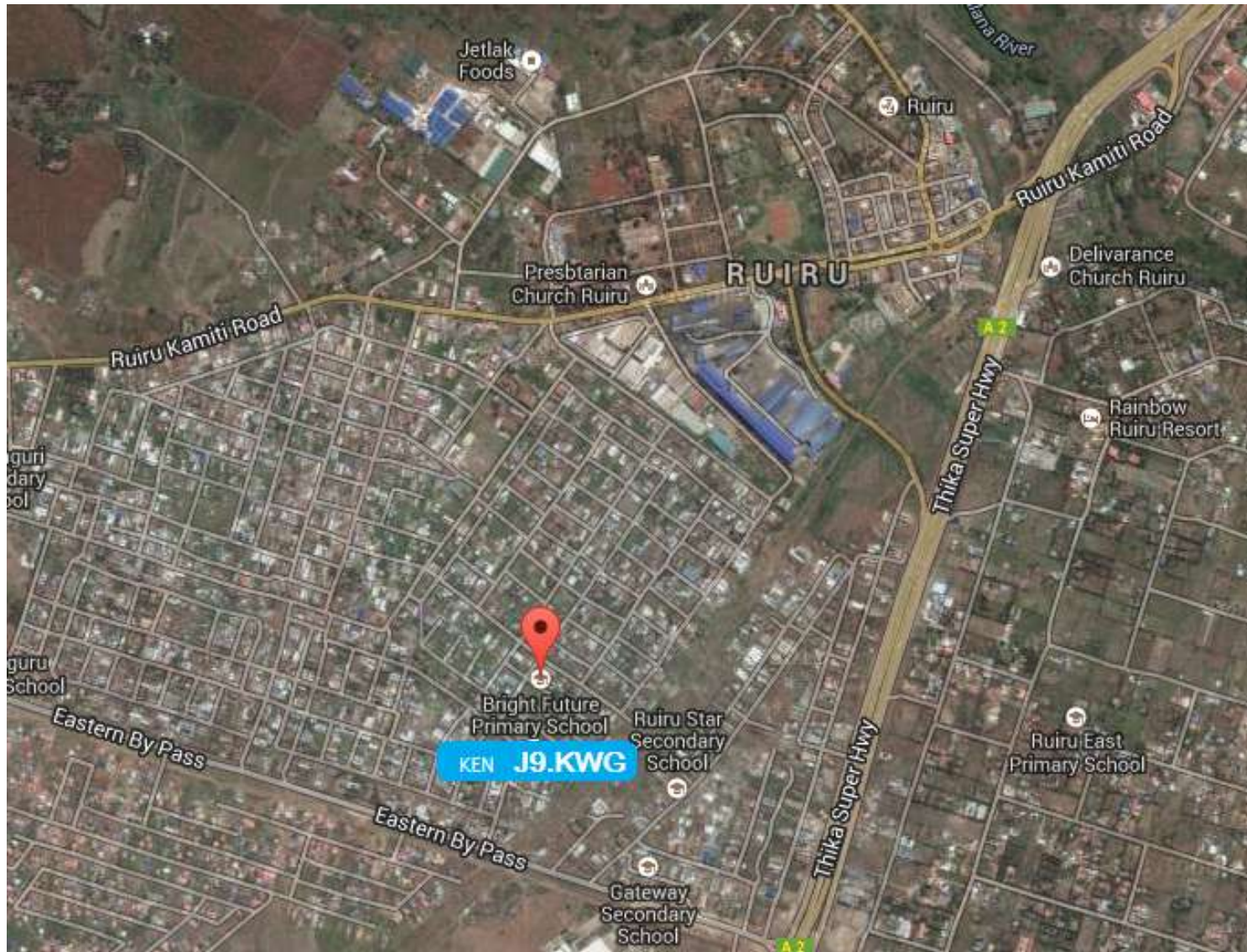
3,000 km² around Nairobi

Mombasa, Miritini

Nakuru (Baruti, Viwanda, Mawanga)

Pop. 405.000

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Kisumu, Kolwa

Pop. 460.000

Kitale

6XX.XX

Pop. 150.000

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Kakamega

7XX.XX

Pop. 110.000

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Malindi (Ganda)

8XX.XX

Ganda

Malindi

B8

Pop. 230.000

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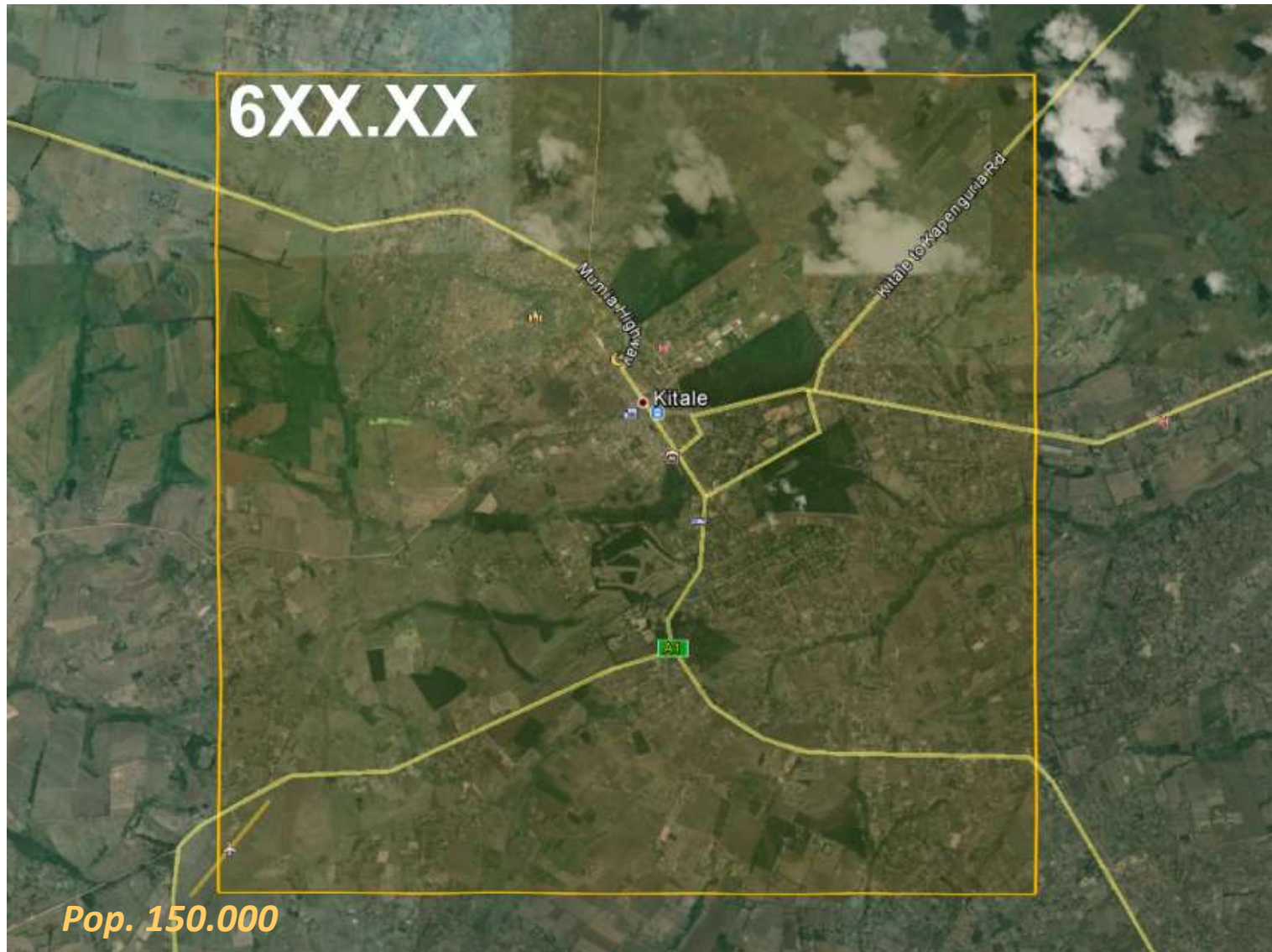
Nyeri (Kiganjo, Gatitu)

Pop. 150.000

9XX.XX

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Garissa (Mororo)

Bungoma

BJ0.00

BZZ**

Pop. 85.000

MAPCODE

Meru

C00.00

Pop. 60.000

MAPCODE

Mumias

CJ0.00

Mumias-Bungoma Road

Mumias

C 40

Pop. 90.000
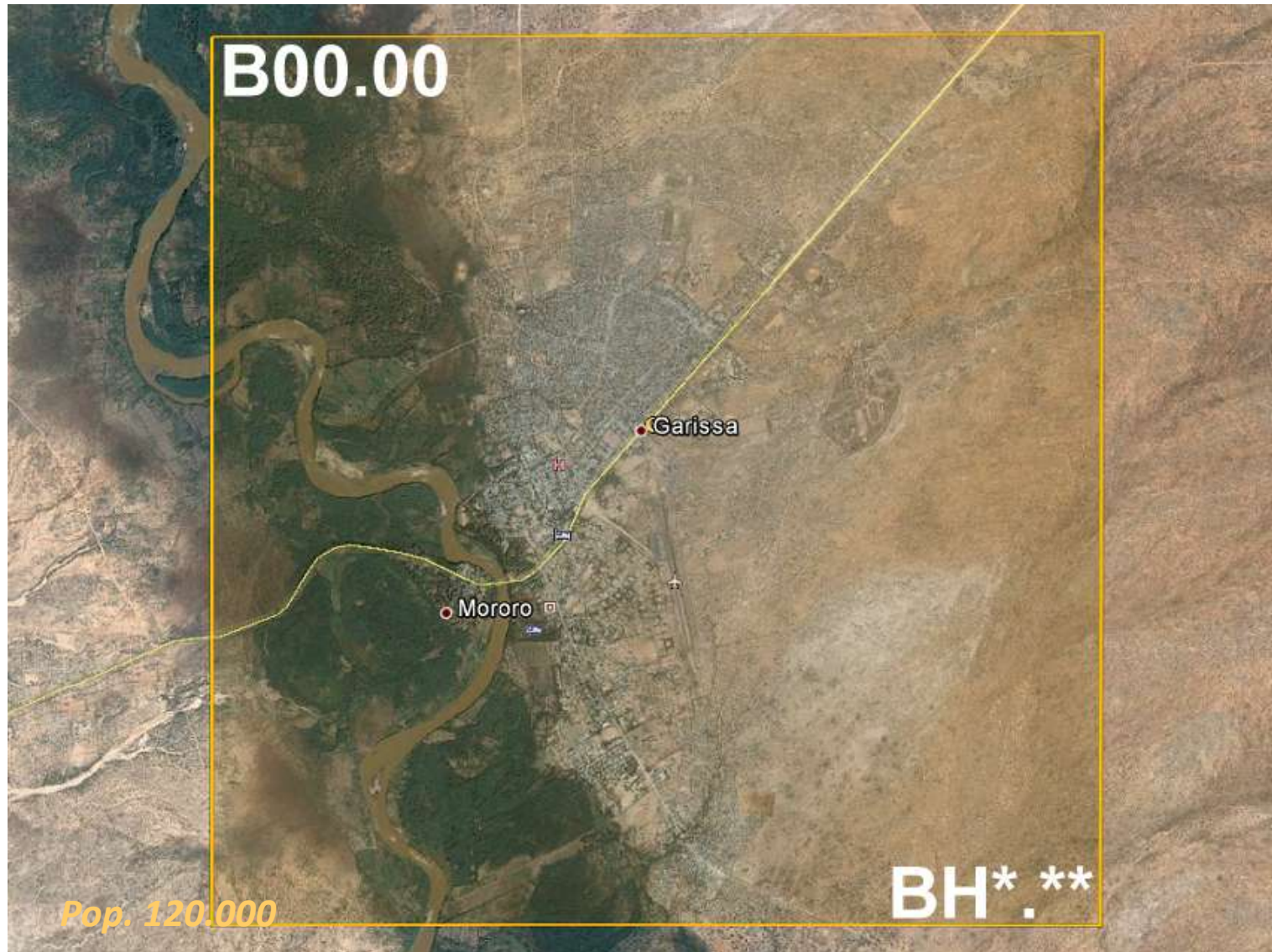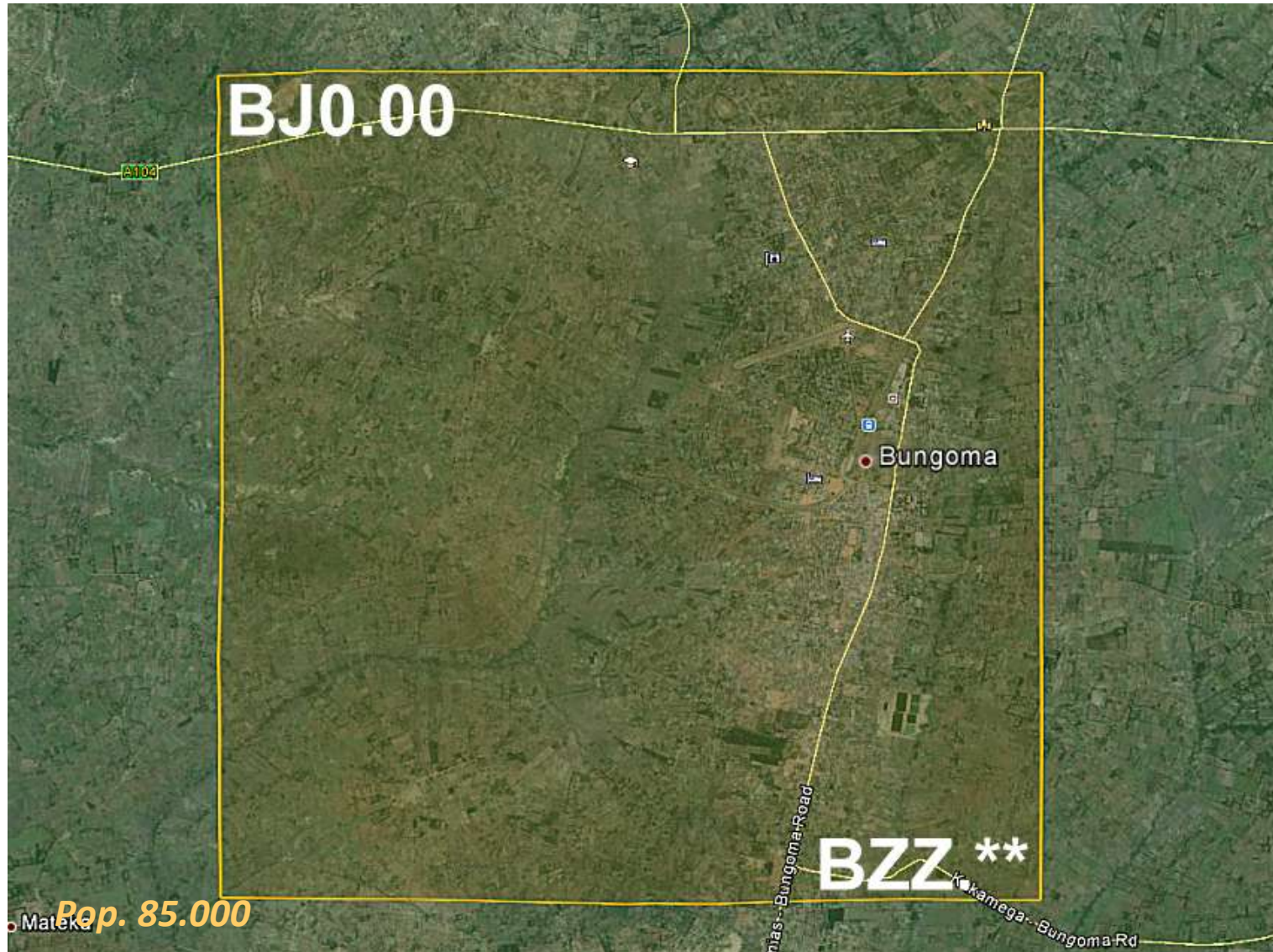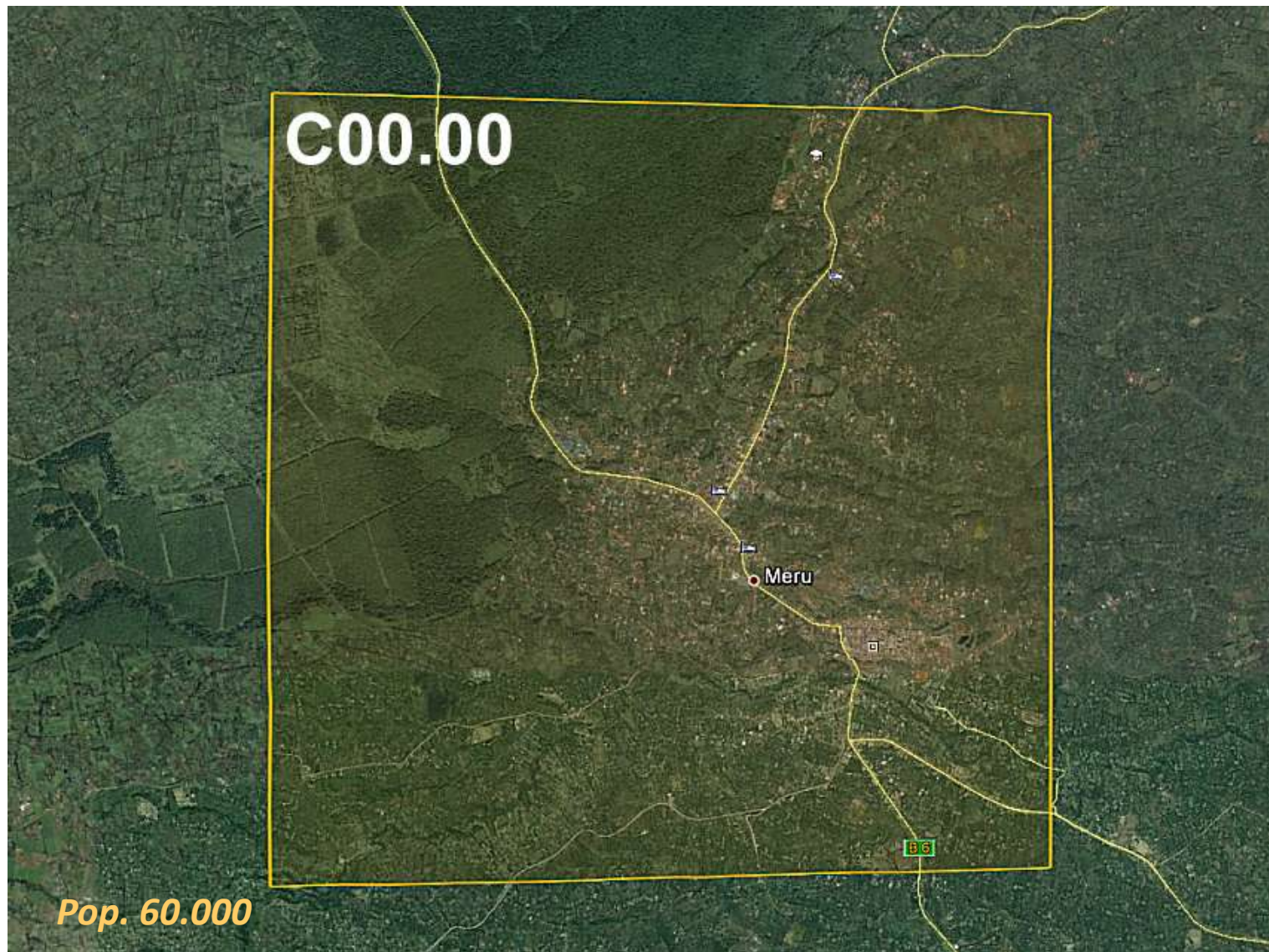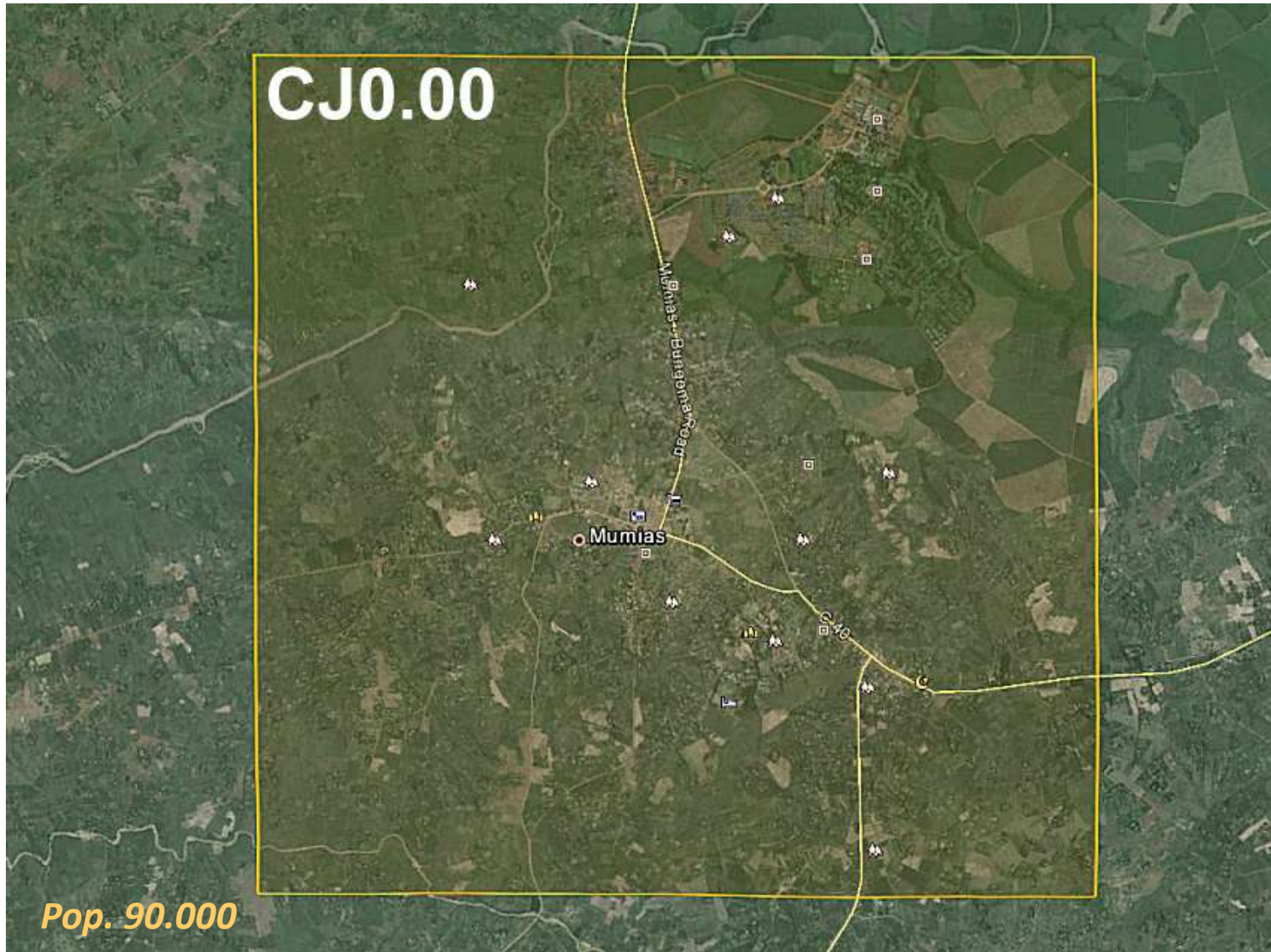
MAPCODE

…… and so on

Area name	population	mapcodes
Naivasha	140,000	D00.00-...
Wajir	85,000	DJ0.00-...
Homa bay	60,000	F00.00-...
Migori	60,000	FJ0.00-...
Nanyuki	50,000	G00.00-...
Embu	60,000	GJ0.00-...
Busia	60,000	H00.00-...
Mandera	90,000	HJ0.00-...
Kilifi	70,000	J00.00-...
Kericho	105,000	JJ0.00-...
Machakos	65,000	K00.00-...
Isiolo	45,000	KJ0.00-...
Kisii	85,000	L00.00-...
Nyahururu	50,000	LJ0.00-...
Narok	70,000	M00.00-...
Molo	110,000	MJ0.00-...
Muranga Town	35,000	N00.00-...
Webuye	65,000	NJ0.00-...
Kapsabet	90,000	P00.00-...

Area name	population	mapcodes
Lamu	12,000	PJ0.00-...
Lodwar	60,000	Q00.00-...
Voi	45,000	QJ0.00-...
Maralal	35,000	R00.00-...
Eldoret	280,000	RJ0.00-...
Lokichar	30,000	S00.00-...
Ol kalou	65,000	SJ0.00-...
Kagumo/Kerugoya	95,000	T00.00-...
Moyale	40,000	TJ0.00-...
Marsabit	25,000	V00.00-...
Ranen/Kitere	20,000	VJ0.00-...
Siaya	45,000	W00.00-...
Muhoroni	35,000	WJ0.00-...
Kitui	30,000	X00.00-...
Makutano	20,000	XJ0.00-...
Kehancha	45,000	Y00.00-...
Magadi	20,000	YJ0.00-...
Taveta	70,000	Z00.00-...
Likoni/Mtongwe	20,000	ZJ0.00-...

6 Digit Mapcodes
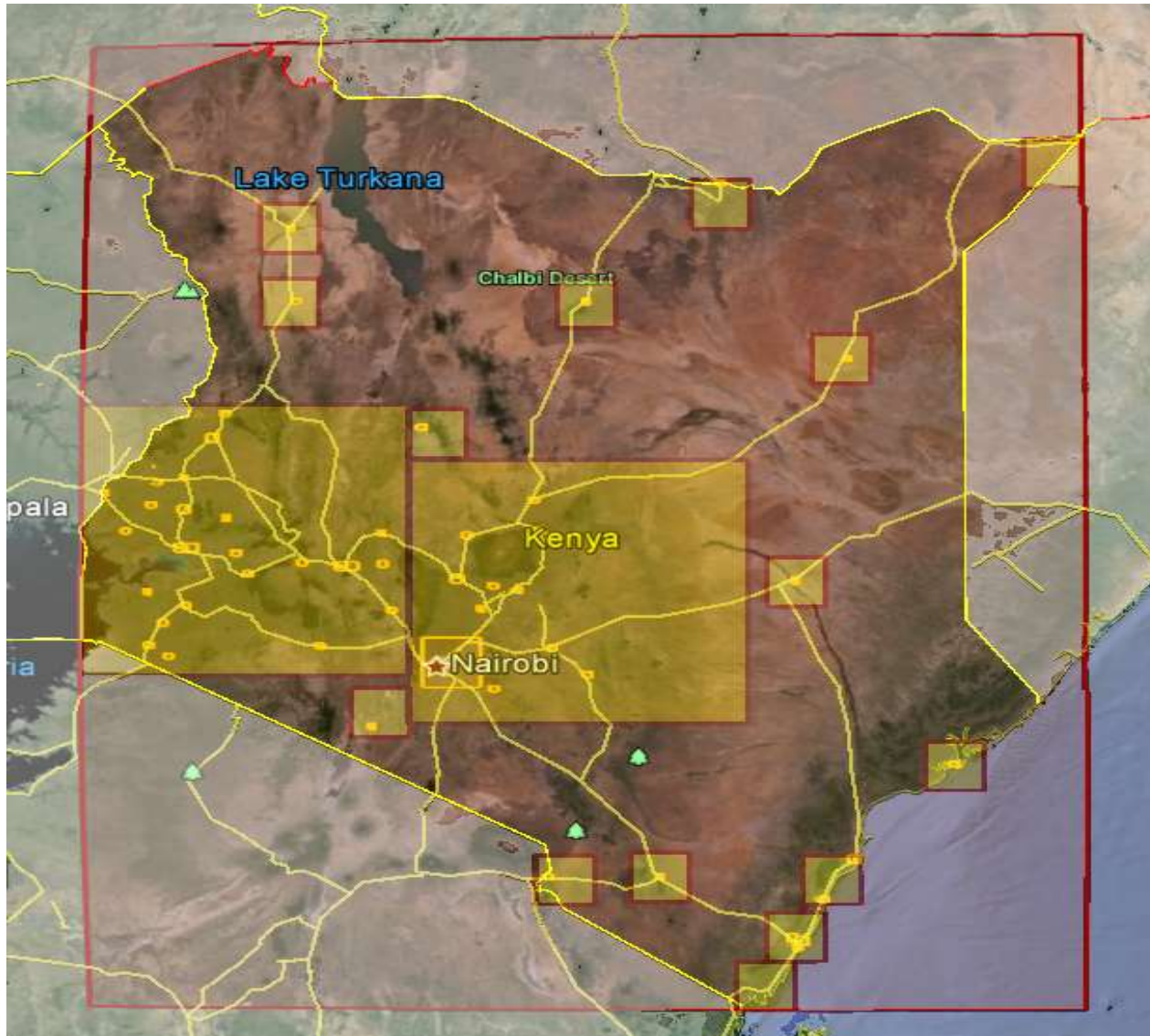
95% of population 6-letter mapcodes or less

25% of population 5-letter mapcodes

1,000,000 have 4-letter mapcodes *(center of Nairobi)*

Universally & Widely Accepted

Mapcodes are universally accepted, and widely supported

- Published as a world-wide standard
- Put all IP in a non-profit Mapcode Foundation
- Allow barrier-free use (no royalties, brand requirements, restrictions or conditions)
- Freely provide specs and source code to mappers (Nokia, ESRI), their customers (Mio, Garmin), and web players (Google, Bing)
- Patent to protect against "flavours"
- Claim maintenance (of algorithms and tables).

Mapcode Foundation

- Non-profit organization
- Stimulates use of Mapcode standard
- Distributes Mapcode sources, specs, tools:
  - C
  - JavaScript
  - PHP
- Maintains the Mapcode standard

Board of Directors

Kewal Shienmar Managing Director	Pieter Geelen Director (Co-Founder TomTom)	Hugo van der Linde Director (CEO AND Publishing)

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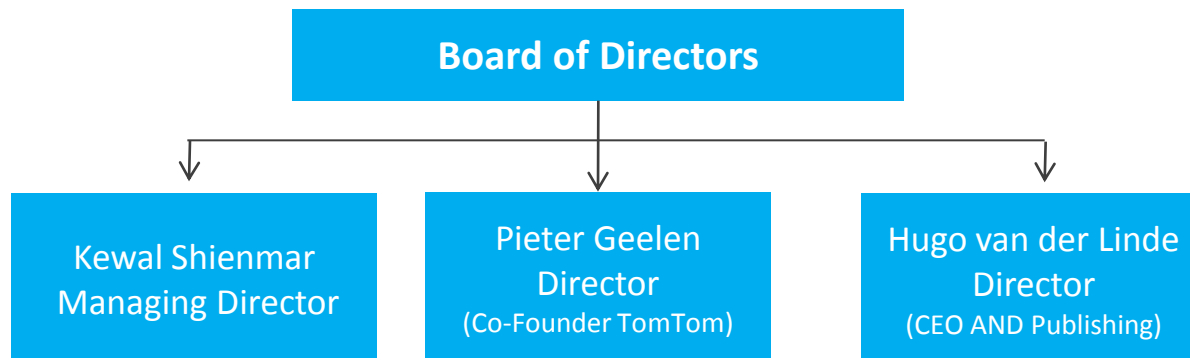
Mapcode Advisory Board & User Group

- **Leading figures from the Mapping, GIS and Navigation industries to join the Mapcode Foundation**

Advisory Board
(Under formation, limited to approx 7 members)

TeleAtlas	Garmin	Nokia Here	Google	ESRI
Alain De Taeye	*Placeholder*	*Placeholder*	*Placeholder*	*Placeholder*
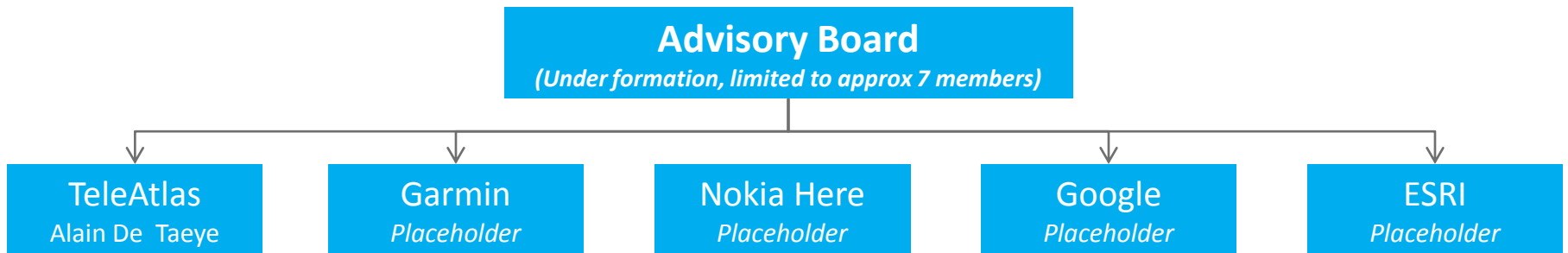
- **Mapcode User Group: platform for discussion, opportunities, meetings**

User Group
(Under formation, unlimited numbers)

TomTom	Garmin	Nokia Here	Bing Maps	*others*
Placeholder	*Placeholder*	*Placeholder*	*Placeholder*	*Placeholder*
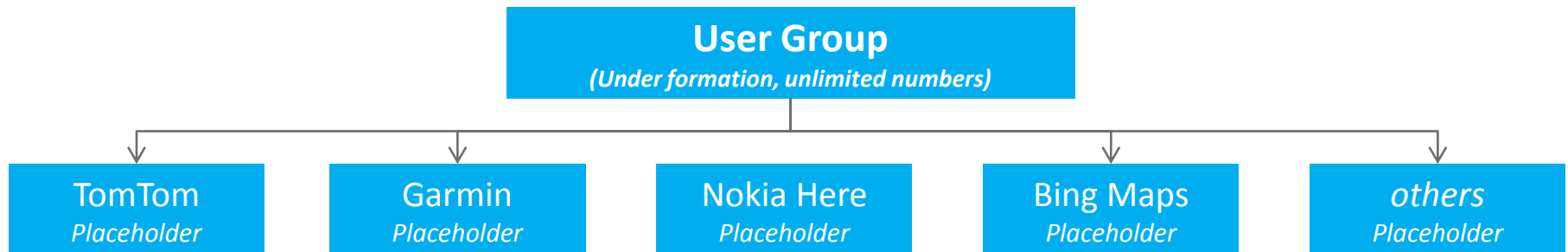
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Mobile web www.mapcode.com/m.html
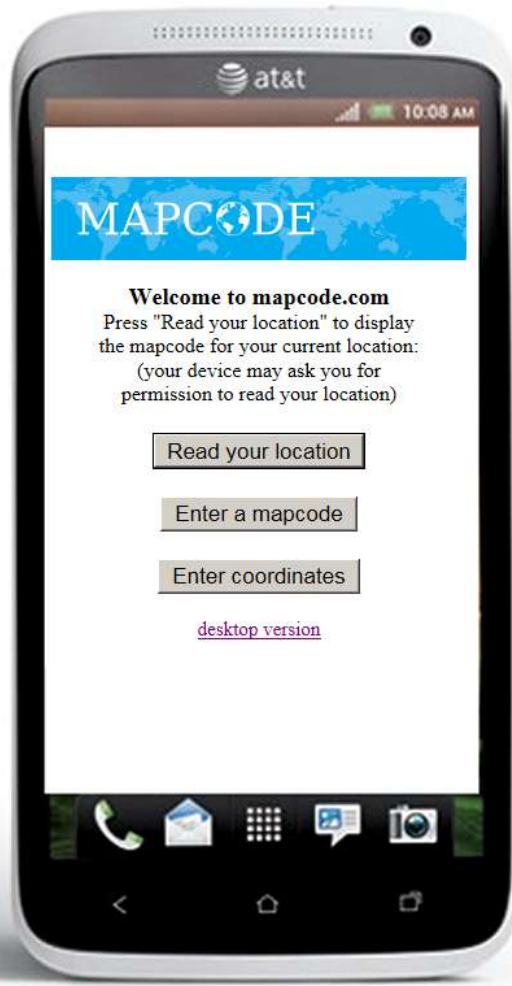
Mapcode Mobile

Free Android App
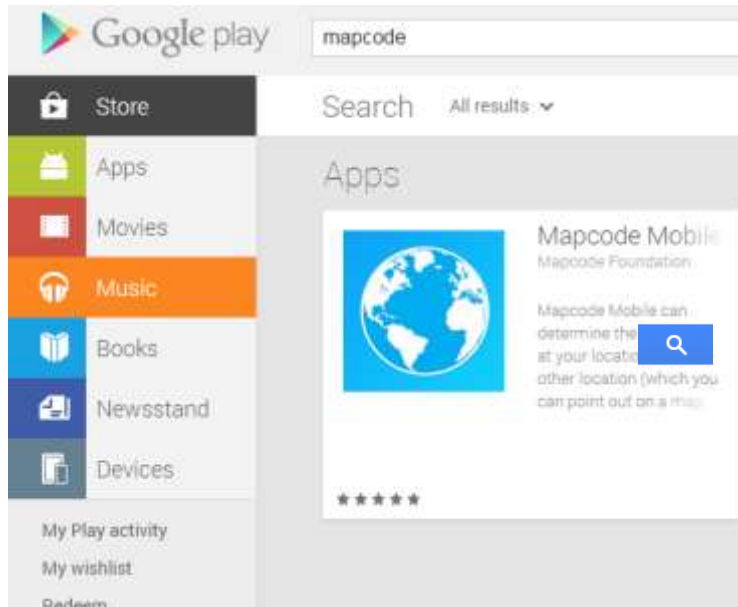
Enter mapcode and search
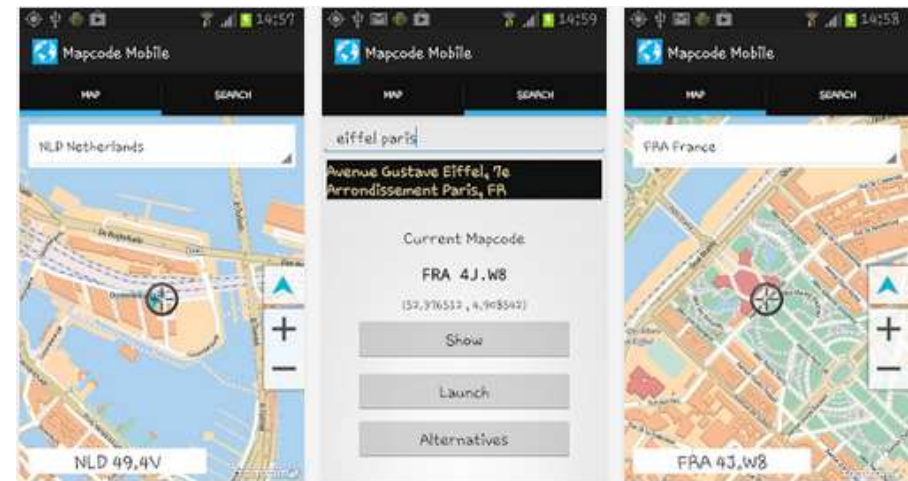
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Web: www.mapcd.in

Free Android App
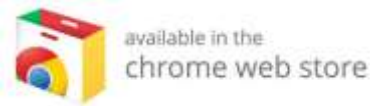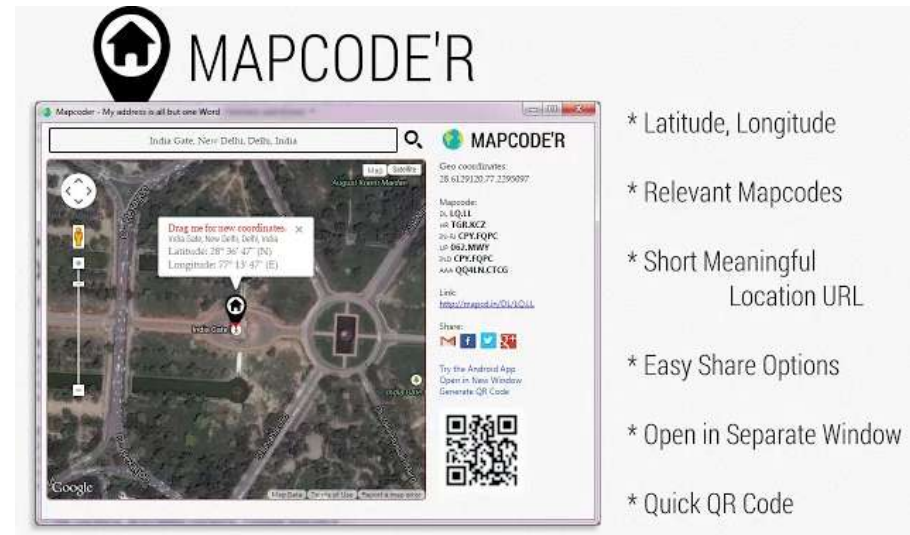
Google Chrome Extension

Mapcode App for iOS
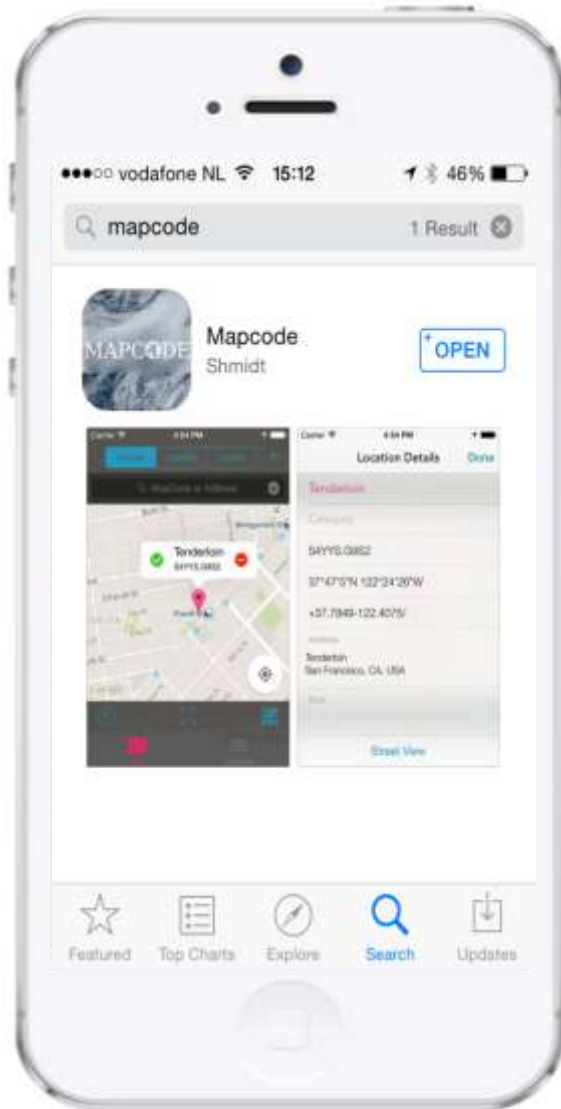
A free app <u>Mapcode for iOS</u> is now available on the App Store

Enter mapcode and search

Mapcode.com

Contains all countries and supports all languages and alphabets

TomTom.com: Mapcode Look Up

TOMTOM

Click anywhere on the map
to find the corresponding
mapcode
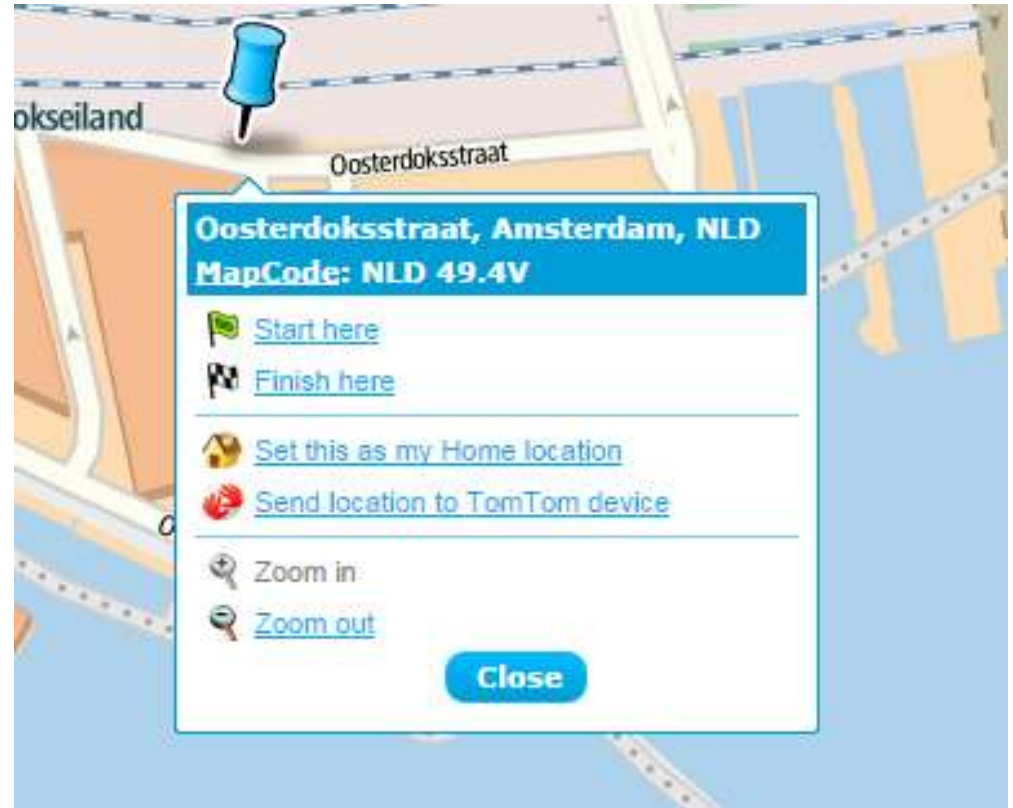
MAPCODE

TomTom.com: Plan a route with a Mapcode
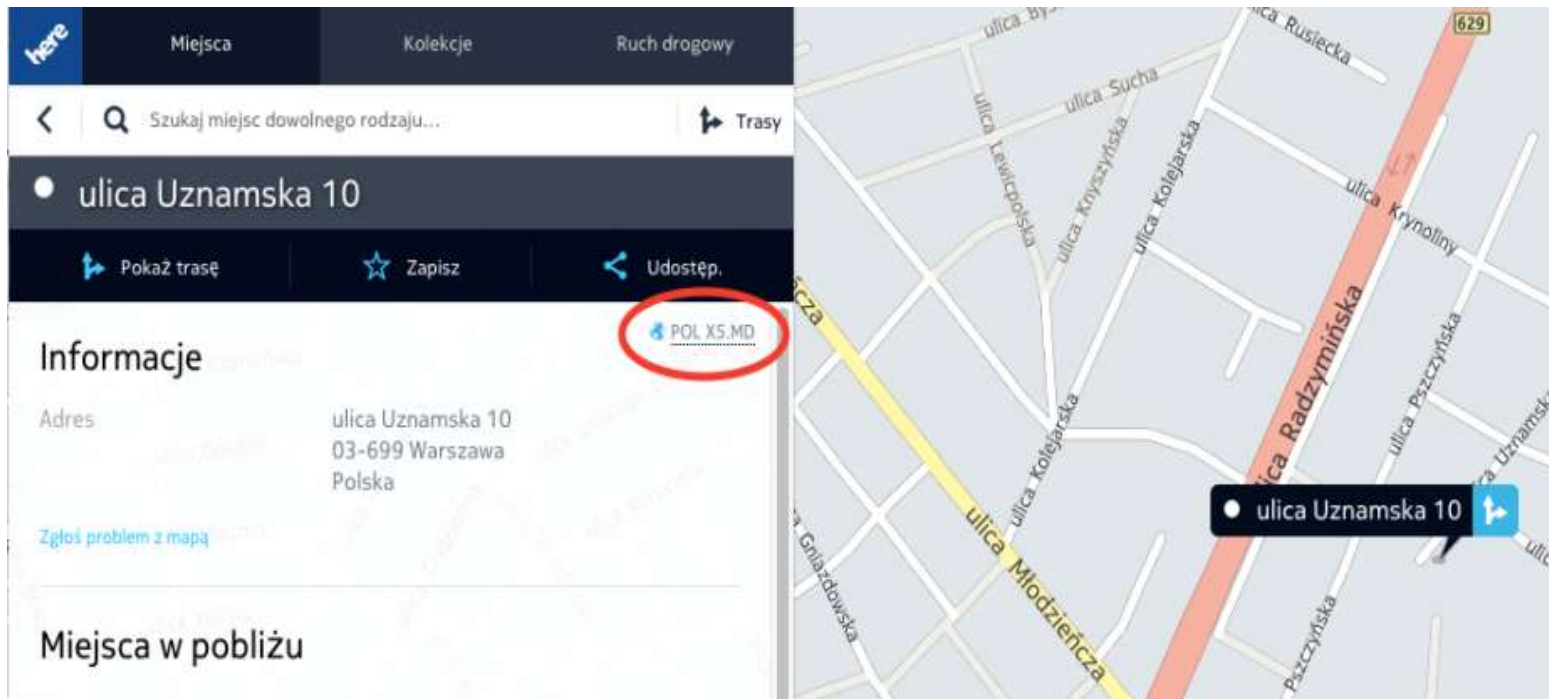

Click on "Start Here"
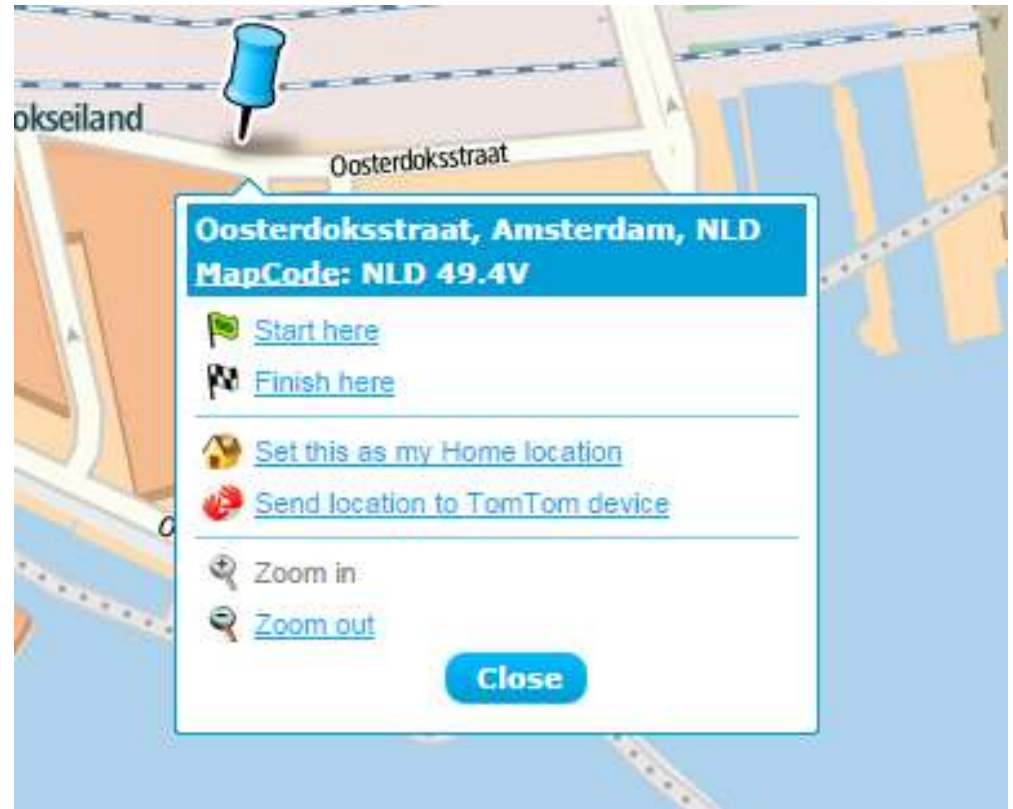
TomTom.com: Plan a route with a Mapcode

- Enter destination mapcode or address

- Click on "Plan Route"

Here Maps – Route Planner
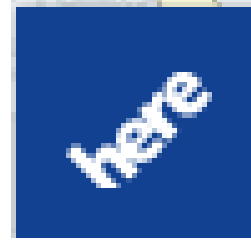
Under implementation at Here Maps

TomTom: Satellite Navigation

Ever increasing support

Mapcodes in 60 million TomTom devices
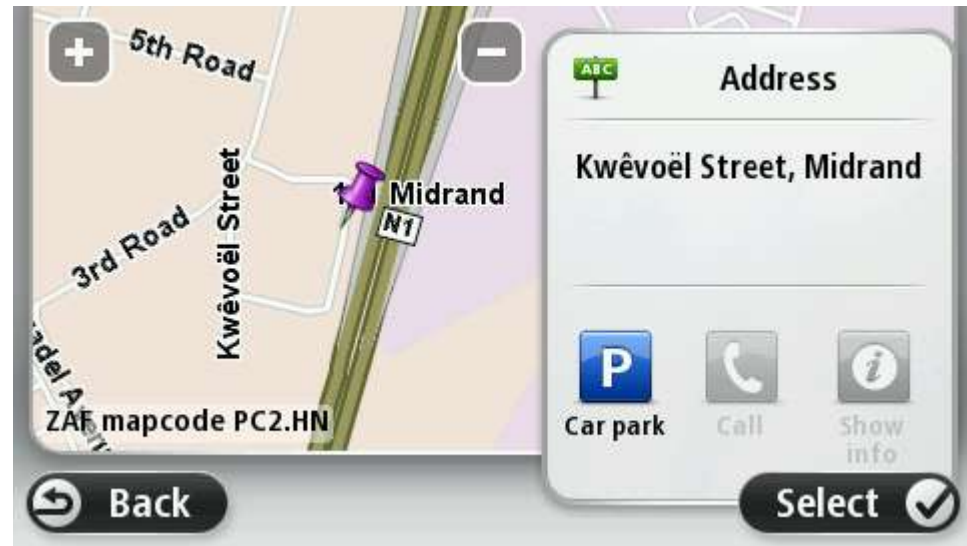
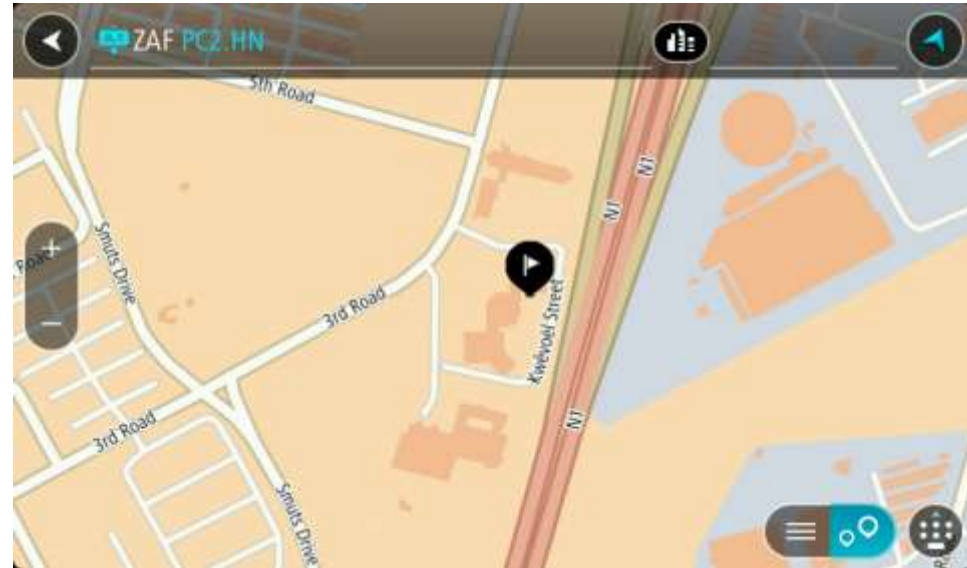*recognized in "city/postcode" input field*

TomTom: Legacy SatNav's

TOMTOM
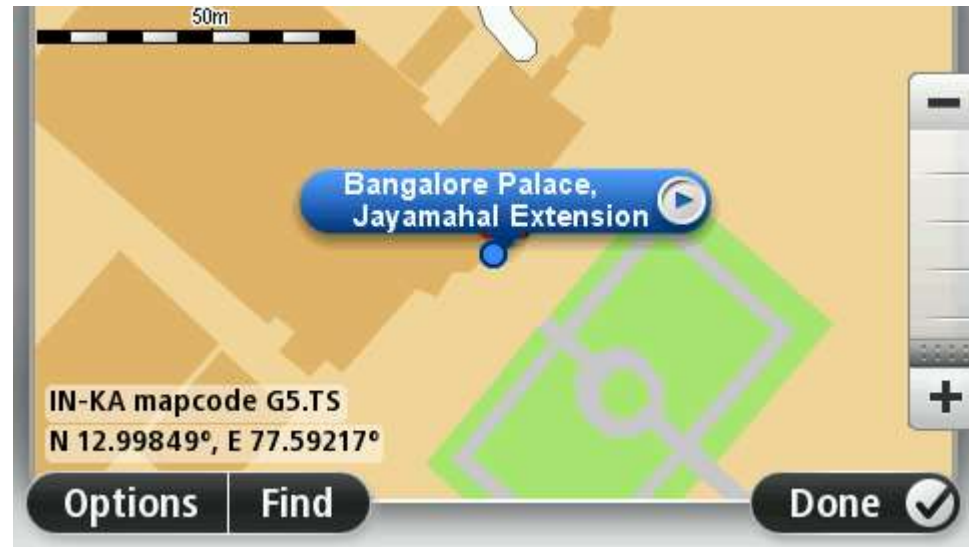

GETTING A MAPCODE FOR YOUR LOCATION

- **PND's** show mapcode of cursor
  - *Map browser, GPS screen, Where Am I?*

MAPCODE

TomTom: Legacy SatNavs

Getting a mapcode for a location

- **SatNav's** show mapcode of cursor position and where you are

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Summary - Mapcodes:

- are **international**

- can be a "**natural**" part of an address

- are **short**, **readable**, and easy to **remember**

- are easy to **verbally** communicate

- are easy to **recognize**

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THANK YOU, ANY QUESTIONS?

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The human face of coordinates

Mapcode Foundation
Herengracht 514
1017 CC Amsterdam
The Netherlands **2W.JW**