

# Mapmaking with Contours and QGIS-Py Tool

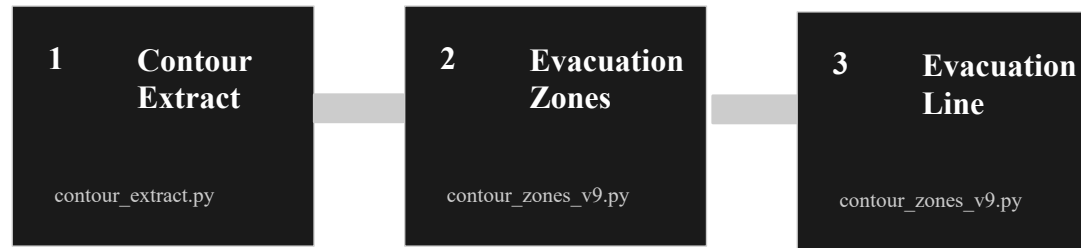
Set up and application of QGIS map processing scripts for Kosrae

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# Overview

These scripts process raw DEM raster files into polygon layers that can be used for a draft of your TR map. Each script handles one stage of the pipeline and can be run individually or as batch in the QGIS Python Console.



*Use `add_basemaps.py` to add Google Roads & Google Satellite layers at any stage*

## Two ways to run:

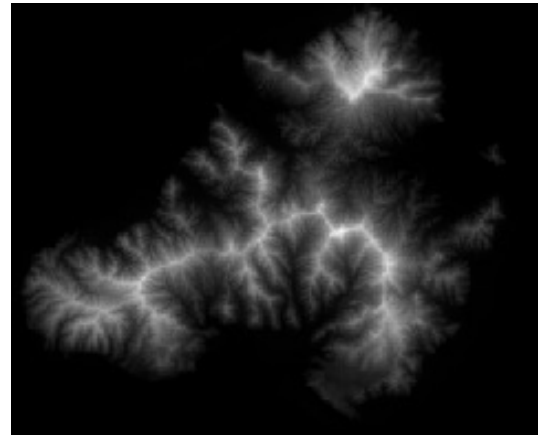
- **Standalone script** — use any individual script in the QGIS Python Console
- **Via Main script** — edit Configure script, then run the Main script

# What does each script do?

DEM for Kosrae

Shoreline for Kosrae

Layers in QGIS



*DEM + Shoreline → draft layers*



(Digital Atlas of Micronesia,  
[www.islands.fm](http://www.islands.fm))



**1** Contour  
Extract

`contour_extract.py`

**2** Evacuation  
Zones

`contour_zones_v9.py`

**3** Evacuation  
Line

`contour_zones_v9.py`

# Contour Line Extraction

## 1 Contour Line Extraction

`contourlines.py`

- **Key feature:** Runs `gdal:contour` on the input DEM raster at two intervals (Default: 10m and 50m).

### Output 10m Contours

- Use as Draft Evacuation Line if no inundation modeling results



### Output 50m Contours

- Major elevation lines



# Draft Evacuation Area and Inland

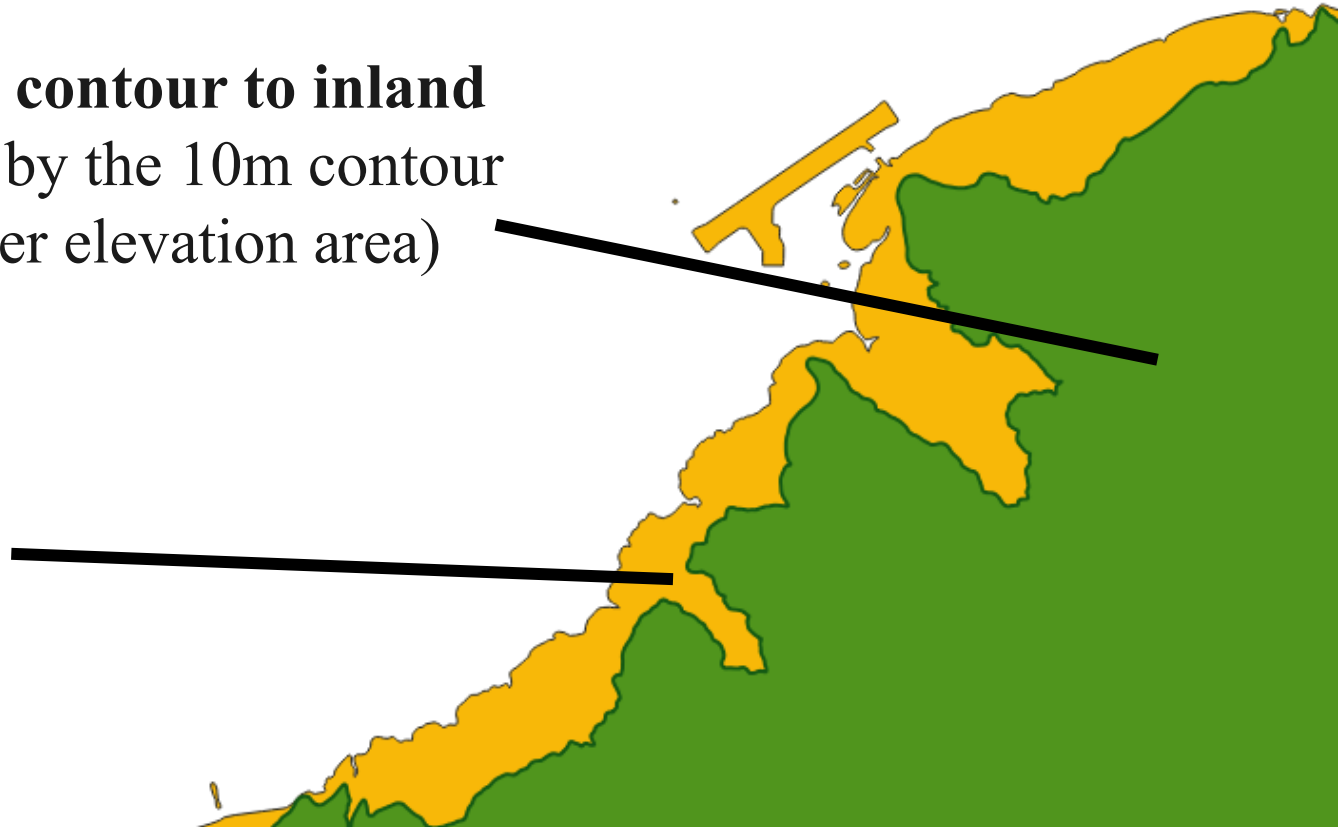
## 2 Contour Zones

`Contour_zones.py`

- **Key feature:** Creates 2 polygons using the 10m contour line and border polygon.

**Inland Zone – 10m contour to inland**  
Everything enclosed by the 10m contour polygon (i.e., higher elevation area)

**Evacuation Zone - shoreline to 10m contour**  
Everything inside the border but outside the 10 m contour ring (i.e., draft inundation area / lower elevation area).



# Draft Evacuation Line

## 3 Draft Evacuation Line

**10m contour line becomes initial  
Draft Evacuation Route**



# Running the Full Workflow

## 1. Open QGIS and load your project

File > Open Project or File > New. The QGIS project does not need to be pre-populated — the script will load the DEM file.

## 2. Open the Python Console

Plugins > Python Console, then click Show Editor.

## 3. Open Main script

Click the folder icon in the editor and browse to your scripts folder.

## 4. a. Open and edit Configuration script

Set `CONTOUR_RASTER_PATH`, `OUTPUT_DIR`, layer names, and interval values.

## 4. b. Save and close Configuration script

## 5. Click Run Main Script

Watch the console output. Each step prints ✓ on success or ✗ on failure with a traceback.

## 6. Inspect results and outputs

Results:

- Evacuation zone draft populated
- Project saved automatically

# Running Scripts Individually

## How to run a single script:

1. Open the script in the QGIS Python Console Editor (Plugins > Python Console > Show Editor).
2. Edit the Configuration script near the top (if applicable).
3. Make sure the input layer is already loaded in your QGIS project.
4. Click Run Script. The script will print progress to the console.

### Example of fields to edit (Configuration script)

```
CONTOUR_RASTER_PATH    = r"C:\Projects\...\Kosrae\data\input\kosrae_dem.tif"  
OUTPUT_DIR              = r"C:\Projects\...\Kosrae\data\output"  
CONTOUR_INTERVAL_10M  = 10  
CONTOUR_INTERVAL_50M  = 50  
LAYER_NAME_10M         = "Kosrae Contours 10m"  
LAYER_NAME_50M         = "Kosrae Contours 50m"
```

# Implementing Workflow

## Requirements

### QGIS LTR 3.44

Scripts use native:meshcontours and other built-in processing algorithms to quickly digitize and process DEM file.

### Python Console

Access via Plugins > Python Console > Show Editor.

### Data – Input DEM

A single-band raster in a projected CRS (e.g., GeoTIFF or similar).

### Data – Border Layer

A polygon layer defining the study area boundary (e.g., kos\_base\_layer).

## Recommended Folder Structure

```
YourProject/  
├── scripts/  
│   ├── contour_extract.py  
│   ├── contour_zones.py  
│   ├── insert_to_template.py  
│   └── add_basemaps.py  
├── data/  
│   ├── input/      ← Put DEM,  
addt'l layers here  
│   └── output/     ← GPKG/SHP  
files saved here  
├── [TR_map].qgz  
├── config_[country].py  
└── main_[country].py
```

# Editing the Configuration Script for Your Project

## File / Paths

```
CONTOUR_RASTER_PATH =  
r"C:\...\dem.tif"  
OUTPUT_DIR           = r"C:\...\output"  
OUTPUT_FORMAT        = "GPKG" # or SHP  
/ GEOJSON
```

## Contour Intervals

```
CONTOUR_INTERVAL_10M = 10  
CONTOUR_INTERVAL_50M = 50  
LAYER_NAME_10M       = "Contours 10m"  
LAYER_NAME_50M       = "Contours 50m"
```

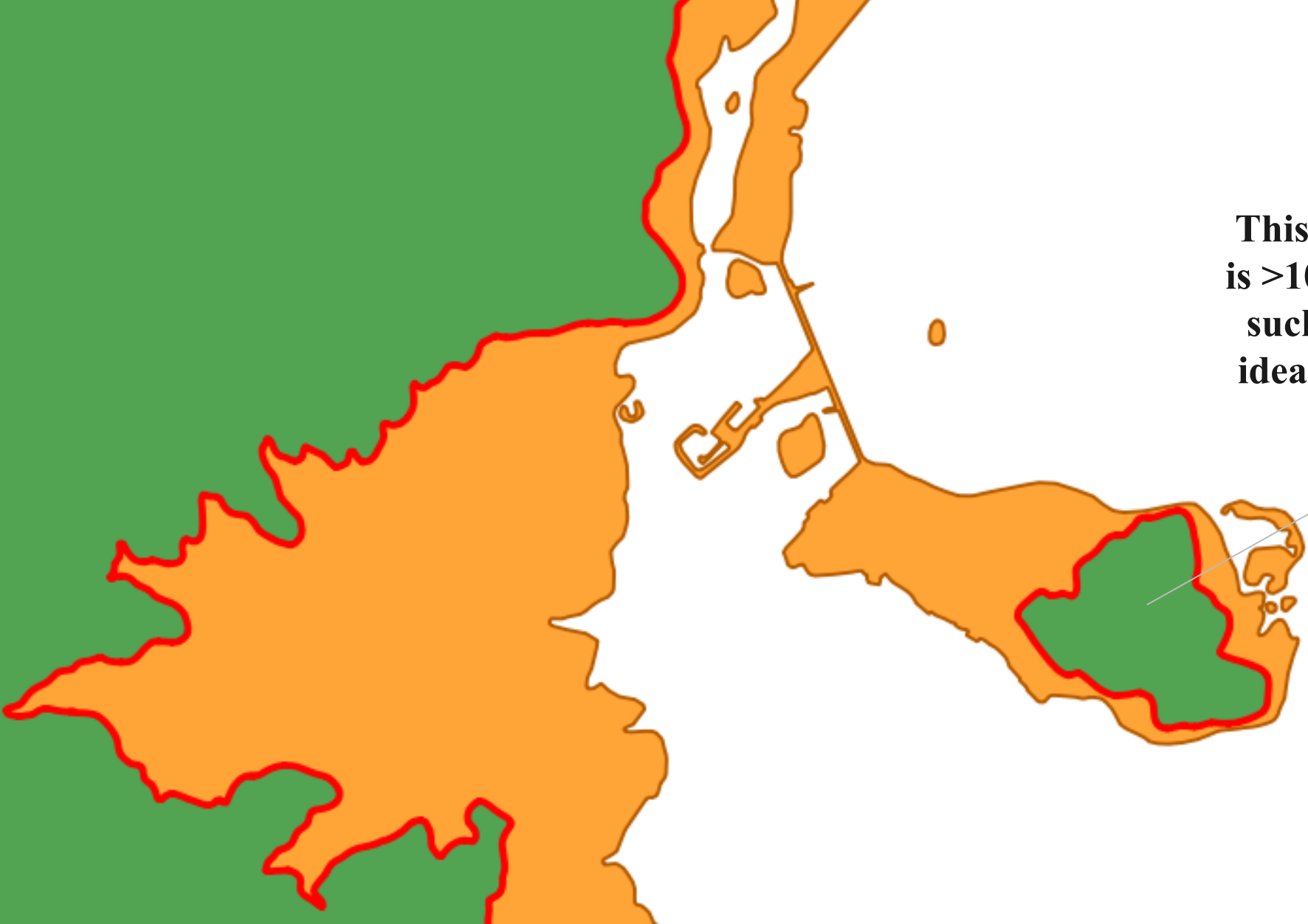
## Contour Shading (Zones) Settings

```
ZONES_CONTOUR_LAYER_NAME = "Contours  
10m"  
ZONES_BORDER_LAYER_NAME =  
"kos_base_layer"
```

## Basemap Toggles – remove this section?

```
ADD_GOOGLE_ROADS       = True  
ADD_GOOGLE_SATELLITE  = True  
MOVE_TO_BOTTOM         = True
```

# Once you've run the script



**This section has elevation data that is  $>10\text{m}$ , so the code categorizes it as such; however, this may not be an ideal area for evacuation in reality.**

# Manually Editing Lines

The screenshot displays the QGIS desktop environment. The main map area shows a coastal region with two elevation zones: a green area labeled 'Inside 10m contour (higher)' and an orange area labeled 'Outside 10m contour (to be...'. A red line, identified as the 'Draft Evacuation Line', is overlaid on the map, following the coastline and a large inland green area. The interface includes a menu bar at the top with options like Project, Edit, View, Layer, Settings, Plugins, Vector, Raster, Database, Web, Mesh, Processing, and Help. Below the menu bar are several toolbars containing various GIS tools. On the left side, there is a 'Browser' panel with 'Favorites' and 'GPS Information' sections, and a 'Layers' panel listing the map's components. On the right side, there is a 'Processing Toolbox' with a search bar and a list of tool categories. At the bottom, a status bar shows the current coordinate (280145, 591164), scale (1:20938), magnifier (100%), rotation (0.0°), and projection (EPSG:32658).

# Manually Editing Polygons

- The Tool generates outputs automatically and should be used as a draft
- Sometimes you may want to adjust results by hand after the tool is run
- Examples of instances where manually editing may be needed:
  - Smooth a jagged edge
  - Remove a small stray area
  - Extend the evacuation line