Basic Guiding Technical Requirements for Programme Design to Reduce Flood Incidents in IDP Sites and Communities in NWS

The multi-sectoral **Technical Working Group (TWiG) on Flood Risk Reduction** was established in 2021, led by the Shelter/Non-Food (SNFI) Cluster, in collaboration with the Camp Coordination and Camp Management (CCCM), Early Recovery and Livelihood (ERL) and Water Sanitation Hygiene (WASH) Clusters.

Building on the engagement of the TWiG, this document aims to provide basic technical guidance on IDP site improvements and communities in north-west Syria (NWS) in order **to mitigate the risk of floods and contribute effectively to disaster reduction**. All the recommended activities and procedures must adhere to Do No Harm principles, provide echo-friendly solutions in the targeted locations and sites and comply to Housing Land and Property (HLP) due diligence. Site selection has to consider the likelihood for flooding, identify flood prone zones and the designed programs should take the following key points into account.

This document contains two different type of guidance:

A) Basic Guidance for Project Proposals

Project proposals are developed in an early stage, without guarantee of implementation. Therefore, the following technical requirements help to understand the feasibility of the project and to estimate the cost and timeframe of implementation. These requirements are generally less precise, they are estimated and require less time for development. Nevertheless, several field assessments and office studies are mandatory for the elaboration of the proposal writing.

Overview Map of the Area and Surroundings (Approximate Scale Range 1:50000) for Proposal

A clear overview map must accompany each project proposal. The map can be produced through any support programme (i.e. Gis, CAD, ev, Google Earth or Opens Street Map) and delivered either embedded in some type of document or in pdf format.

The aim of this map is to geo-reference the location of interest in order to easily understand the context (location, morphology, involved host communities, access to the location, conflict situation, and natural/urban environment).

It is important that the map displays the following items:

- Clear title with project's name, location of project and governorate.
- Date.
- Name or/and logo of organization.
- The area of interest must be clearly visible and identifiable (eventually with boundary reflected in the legend).
- Locations with names of host communities close to the area of interest.
- Existing main roads, streams, waterbodies, important facilities, like power lines, bridges, or mosques.
- Legend.
- North arrow.
- Scale bar.

Main text (bullet points) linked to the map/project containing essential key information depending on the topic of the project proposal such as:

- Size of site.
- Estimated capacity of site (HH and/or quantity of shelters) planned activities: quantity of planned shelters, km of roads, km of drainage, planned WASH facilities, etc.).
- Land and soil use/description (soil use, soil type, eventually level of groundwater etc.).
- HLP conditions (private/public/limitations).

1. Road Construction (Internal Site Roads, Access, and Connection Roads) for Proposal

1.1 Project maps (approximate scale range 1:100 to 1:5000 depending on the site/project size).
Maps have to be produced on CAD or GIS platform. Google Earth or Open

Street Map are not adequate, since those platforms are not satisfactory for the development of precise technical drawings/thematic maps.
The maps should include:

- Clear title with name of site/project.
- Date.
- Name or/and logo of organization.
- All roads of interest (identified with specified different intervention type i.e. new construction, hard/light rehabilitation, etc.). Several maps might be necessary for one project proposal.
- Roads should be segmented depending on the type of intervention.
- Each road segment should receive a unique name/nomenclature.
- Location of important new rainwater drainage related to road construction should be visible in the maps (i.e. drainage, channels, culverts).
- Contour lines based on freely available digital terrain model or other immediate sources (i.e. drone survey).
- The legend should be present, indicating all the important elements visible in the map.
- Scale bar.

1.2 Text describing the technical evaluation of the concerned or planned roads including the rate of mobility (# of IDPs, host communities using them).
It is recommended to classify the existing/constructed roads under three main categories (driveways and public footpaths, vehicles used roads, heavy used roads/highways) and this classification will play a vital role in designing the road body (layers type and thickness).
Road described in the text must be identifiable in the maps 1.1 with a unique segment name.

1.3 Programme design, including all the programme phases with estimated time frame and defined activities and actions to ensure the quality and results.

1.4 Estimated bill of Quantities (BoQ) clearly linked to the above-mentioned documents (drawings, maps, nomenclature).

1.5 Price analysis tables for the activities listed in BoQ.

1.6 Detailed technical conditions books for the implementation phases.

2. Site Gravelling, Terracing and Trenching for Proposal

2.1 Project maps of the area to terrace/gravel/improve (approximate scale range 1:100 to 1:5000 depending on the site/project size).
Detailed maps has to be produced (CAD or Gis, no Google Earth).
The maps should include/display:

- Clear title with project name and location.
- Date.
- Name or/and logo of organization.
- The area of interest must be clear visible and defined, (eventually with boundary reflected in the legend).
- The estimated location of drainages within the area of interest (with clear specification if combined or separated) must be visible. Several maps might be necessary for one project proposal.
- Area of interest and drainage should be segmented/split depending on the type of intervention (planned thickness of gravel, estimated size of drain).
- Each segment should receive a unique name/nomenclature.
- The main special elements related to drainage should be clearly visible in the maps (i.e., culvert, etc.).
- Contour lines based on freely available digital terrain model or other immediate sources (i.e. drone survey).
- A legend should be present, indicating all the important elements visible in the map.
- Scale bar.
- Eventually short text with key elements (bullet points, i.e. m3 of material to excavate. M3 of gravel, km of drainage, etc.).

2.2 Text describing technical specification for planned gravelling work.

2.3 Drainage basic plans for existing roads and narrative.
Drainage basic plans and exhaustive narrative for new roads.
No road projects are accepted without a drainage plan solution.

2.4 Programme design, including all the programme phases with estimated period and defined activities and actions to ensure the quality and results.

2.5 Estimated BoQ clearly linked to the above-mentioned documents (drawings, maps, nomenclature).

2.6 Price analysis tables for the activities listed in BoQ.

2.7 Detailed technical conditions books for the implementation phases.

3. Tents / RHU Installation for Proposal

3.1 Layout map with displayed distances between tents/RHUs including roads and spaces reserved for public structures within the settlement (Gis or CAD) (approximate scale range 1:100 to 1:5000 depending on the site/project size). Maps should include pathways and connection paths (if no separate gravelling or road program exists).

3.2 Detailed text information about tent/RHU insulation (type of ground levelling, type of insulation, gravel or solid slab) technical specification of the proposed insulation and rising, external and internal insulation). Text

might contain drawing and pictures and should refer to well known or accepted procedures.

3.3 A text document should explain the drainage situation of the site (watershed, link of individual drain to main site drainage) and refer to existing drainage or planned drainage project. The text must reflect comprehensive information on the sewer situation.

3.4 Text document, containing installation guidance and considering the wind force mitigation measures.

3.5 Programme design, including all the programme phases with estimated period and defined activities and actions to ensure the quality and results.

3.6 Estimated BoQ clearly linked to the above-mentioned documents (drawings, maps, nomenclature).

3.7 Price analysis tables for the activities listed in BoQ.

3.8 Detailed technical conditions books for the implementation phases.

4. Rain-water Drainage and Sewerage Network for Proposal

4.1 Project map of the area including the whole drainages situation (approximate scale range 1:100 to 1:5000 depending on the site/project size).

Those maps have to be produced based on CAD or Gis support (no Google Earth).

The maps should include/display:

- Clear title with project name and location name of site.
- Date.
- Name or/and logo of organization.
- Estimated location of pipes for rainwater/sewage in and around the site with clear direction flow and the exit of the drainage. Each pipe segment will have its own nomenclature.
- Contour lines based on freely available digital terrain model or other immediate sources (i.e. drone survey).
- Estimated location for special elements related to drainage (i.e., septic tanks, inspection chamber, etc.).
- The legend should be present, indicating all the important elements visible in the map.
- Scale bar.
- Short text with key elements (bullet points, i.e. type of drainage, type of sewer treatment, km of drainage, qty of material to excavate, qty of gravel, etc.)

4.2 Estimated size of pipes (rain and sever) based quantity of users, field observations and size of watershed (i.e. estimated with Global Mapper).

4.3 Narrative about septic tank (estimated size and type and maintenance).
4.4 Text information about "Do No Harm principles" adhered to for the surrounding environment (i.e., desludging options, connection to existing city drainage system, existing wastewater treatment units, rainwater discharge solutions).
Reflected/clarified to all stakes holders an as well in the HLP agreement.
4.5 Programme design, including all the programme phases with estimated period and defined activities and actions to ensure the quality and results.
4.6 Estimated BoQ clearly linked to the above-mentioned documents (drawings, maps, nomenclature).
4.7 Price analysis tables for the activities listed in BoQ.
4.8 Detailed technical conditions books for the implementation phases.

5. Safer / Improved Access to Services Using Solar Lighting Programme for Proposal

5.1 Layout map of the area including all locations for the solar lights (approximate scale range 1:100 to 1:5000 depending on the site/project size).
Maps have to be produced on CAD or GIS support (not Google Earth).
The maps should include/display:
- Clear title with project name and location name of site.
- Date.
- Name or/and logo of organization.
- Scope of location, where solar lights are planned.
- The legend should be present, indicating all the important elements visible in the map (roads, WASH, marked, and schools).
- Scale bar.
- Short text with key elements (bullet points, i.e. qty of solar lights, model, and specifications).

5.2 Detailed drawings of structure of light (including basement) and description of elements (CAD).
5.3 Programme design, including all the programme phases with estimated period and defined activities and actions to ensure the quality and results.
5.4 Estimated BoQ clearly linked to the above-mentioned documents (drawings, maps, nomenclature).
5.5 Price analysis tables for the activities listed in BoQ.
5.6 Detailed technical conditions books for the implementation phases.

B) Basic Guidance for Project Implementation

Projects are implemented after formal approval and commitments from donors. Therefore, these technical requirements are the essential requisites for the project implementation. Costs and timeframe of implementation are based on precise implementation programs, precise drawings and show a small margin of error.

Overview Map of the Area and Surroundings (Approximate Scale Range 1:50000) for Implementation

The overview map of the area can be similar to the project proposal map if no changes are identified. All modifications to project proposals must be clearly visible on new maps.

1. Road Construction Implementation (Internal Site Roads, Access, and Connection Roads)

1.1 Detailed project maps (approximate scale range 1:100 to 1:5000 depending on the site/project size).
Maps have to be produced on the CAD or GIS platforms. The maps should include:

- Clear title with name of site/project.
- Date.
- Name or/and logo of organization.
- All roads of interest (identified with specified different intervention type i.e. new construction, hard/light rehabilitation, etc.). Several maps might be necessary for one project.
- Roads should be segmented depending on the type of intervention.
- Each road segment should receive a unique name/nomenclature.
- Location of important rainwater drainage (new and existing) related to road construction should be visible in the maps (i.e. drainage, channels, culverts, ditch, sluice gates, cesspits, manholes, etc.).
- Contour lines based on precise topographic survey.
- The legend should be present, indicating all the important elements visible in the map.
- Scale bar.

1.2 Detailed drawings (CAD) with all roads' segments (based on segments and nomenclature visible the detailed map 1.1).

Drawings should include elevations (quotes from topographic survey), slopes, profiles, and sections). CAD drawings should be rendered in PDF format and display a clear informative title, legend and dimensions.

1.3 Detailed drawings (CAD) of rainwater drainage related to the road works. Those drawings should include elevations, slope and hydraulic proprieties. The location of those items should be identifiable on map 1.1. CAD drawings should be rendered in PDF format and display a clear informative title, legend and dimensions.

1.4 Detailed drawings (CAD) of rainwater special constructions such as bridges and culvert, ditch, sluice gates, cesspits, manholes etc . Those drawings should include when necessary all the elevations (quotes from topographic survey). CAD drawings should be rendered in PDF format and display a clear informative title, legend and dimensions. The location of those items should be identifiable on map 1.1.

1.5 Topographic survey.
Precise elevations must be the result of a detailed and precise topographic survey. All elevations, quotes, contour lines and digital terrain model should derive from a recent precise topographical survey.

1.6 Text describing the technical evaluation of the concerned or planned roads including the rate of mobility. This document is mandatory if major changes occur compared with the text in the project proposal .

1.7 Text describing the geotechnical standards and calculation. This should include the soil type and classification based on the AASHTO standards or USCS. It is recommended to referer to the soil type/classification for the subgrade layer in the topographic elevations' sections along the whole road path and using the visual inspection for the classification of soil (descriptions of colour, particle size and shape, stiffness, density, moisture, and other sample properties are logged and used to create the site's soil profiles). Field classifications may be used to assign the samples to group indexes of ASTM or AASHTO classification systems. Visual classification is an efficient way of ensuring that each sample is examined to document basic features (gravel and sand, silty or clayey gravel and sand, silty soils, clayey soils. etc.).

1.8 Road body design. Based on the soil classification/type and AASHTTO recommendations, it is possible to identify the engineering solutions for the sub-grade layer (levelling with compacting, removing with replacing, improving the soil by using traditional/non-traditional additives etc.). After finalizing the sub-grade layer treatment, the sub-base and base layers should be designed in terms of grain size and layer thickness after considering that the sub-base is often the main load-bearing layer of the pavement. Its role is to spread the load evenly over the sub-grade layer. The materials used may be unbound granular. The quality of sub-base is

very important for the useful life of the road and can outlive the life of the surface, which can be scrapped off and after checking that the sub-base is still in good condition, a new layer can be applied. The aggregate material that should be used in both sub-base and base layers should be well graded (from the coarser to the finer) and in compliance with the required specifications (please consult the LINK; to be used when the equipped labs for conducting the required tests are available).

1.9 Water drain sizing analysis. Whenever rainwater drainage is planned:
- Watershed analysis to estimate/verify the size of the planned drainage.
- Calculation for drainage size (manually/SWMM/SewerGems/StormCad or other similar simulation hydraulic software).

1.10 Programme design, including all the programme phases with precise period and defined activities and actions to ensure the quality and results.

1.11 Precise BoQ clearly linked to the above-mentioned documents (drawings, maps, nomenclature).

2. Site Gravelling, Terracing and Trenching implementation

2.1 Detailed project maps of the area to terrace/gravel/improve (approximate scale range 1:100 to 1:5000 depending on the site/project size).
Detailed maps have to be produced (CAD or Gis, no Google Earth).
The maps should include/display:

- Clear title with project name and location.
- Date.
- Name or/and logo of organization.
- The area of interest must be clear visible and defined, (eventually with boundary reflected in the legend).
- The estimated location of drainages within the area of interest (with clear specification if combined or separated) must be visible. Several maps might be necessary for one project proposal.
- Area of interest and drainage should be segmented/split depending on the type of intervention (planned thickness of gravel, estimated size of drain).
- Each segment should receive a unique name/nomenclature.
- Main special elements related to drainage should be clearly visible in the maps (i.e., culvert, etc.).
- Contour lines based on precise topographic survey.
- A legend should be present, indicating all the important elements visible in the map.
- Scale bar.

- Eventually Short text with key element (bullet points, i.e. m3 of material to excavate. M3 of gravel, km of drainage, etc).

2.2 Topographic survey.
Precise elevations and quotes must be the result of a topographic survey. All elevations, quotes, contour lines and the digital terrain model should derive from a recent topographic survey.

2.3 Text describing technical specification for planned gravelling work, terracing and trenching based on soil investigation and groundwater investigation (in case of high ground water level). Eventually Cut and Fill analysis based on the digital terrain model derived from the precise topographic survey.

2.4 The reference for soil classification based on AASHTO standards or USCS standards (report and drawings) in case of presence of asphalt and gravel roads.

2.5 Drainage plan based on the topographic survey and watershed analysis. Projects are not complete if drainage solutions are not included.

2.6 Programme design, including all the programme phases with precise period and defined activities and actions to ensure the quality and results.

2.7 Precise BoQ clearly linked to the above-mentioned documents (drawings, maps, nomenclature).

3. Tents / RHU Installation

3.1 Detailed layout map with displayed distances between tents/RHUs including roads and spaces reserved for public structures within the settlement (Gis or CAD) (approximate scale range 1:100 to 1:5000 depending on the site/project size). Maps should include pathways and connection paths (if no separate gravelling or road program exists). This map is necessary if changes occurred compared with the project proposals.

3.2 Detailed text information about tent/RHU insulation (type of ground levelling, type of insulation, gravel or solid slab) technical specification of the proposed insulation and rising, external and internal insulation). Text might contain drawing and pictures and should refer to well known or accepted procedures. Necessary if changes occurred compared with the project proposals.

3.3 A text document should explain the drainage situation of the site (watershed, link of individual drain to main site drainage) and refer to existing drainage or planned drainage project. The text must reflect as well comprehensive information to the sewer situation. Necessary if changes occurred compared with the project proposals.

3.4 Precise programme design, including all the programme phases with precise period and defined activities and actions to ensure the quality and results.

3.5 Precise BoQ clearly linked to the above-mentioned documents (drawings, maps, nomenclature).

4. Rain-water Drainage and Sewerage Network implementation

4.1 Detailed project map of the area including the whole drainages situation (approximate scale range 1:100 to 1:5000 depending on the site/project size). This map is necessary if changes occurred compared with the project proposals.
Those maps have to be produced based on CAD or Gis support.
The maps should include/display:

- Clear title with project name and location name of site.
- Date.
- Name or/and logo of organization.
- Precise location of pipes for rainwater/sewage in and around the site with clear direction flow and the exit of the drainage. Each pipe segment will have its own nomenclature.
- Contour lines based on precise topographic survey.
- Precise location for special elements related to drainage (i.e., septic tanks, inspection chamber, etc.).
- The legend should be present, indicating all the important elements visible in the map.
- Scale bar.
- Short text with key element (bullet points, i.e. type of drainage, type of sewer treatment, km of drainage, qty of material to excavate, qty of gravel, etc.).

4.2 Precise calculation of expected rainwater quantity to be drained based on local precipitation values/frequency, soil type of watershed, slope and size of watershed (manually or using dedicated software, like SWMM, Global Mapper, SewerGems, other).

4.3 Topographic survey.
Precise elevations and quotes must be the result of a topographic survey. All elevations, quotes, contour lines and the digital terrain model should derive from a recent topographic survey.

4.4 Precise calculation of size of pipes and channels, considering the maximal and minimal slope of pipe/channels, the maximal and minimal velocity of water/sewer and based quantity of users as per Syrian standards. Type of

pipe material need to be considered in the calculations as per Syrian standards.

4.5 Detailed drainage drawings (CAD) with all drainage segments (based on segments and nomenclature visible the detailed map 4.1).
CAD drawings should include elevations (quotes), slopes, profiles, sections and hydraulic proprieties. Drawing can be partially automatically generated from the simulation software (i.e. SewerGems).

4.6 Detail drawings (CAD) of rainwater special constructions such as manholes, inspection chambers, valves, culverts, ditches, sluice gates, cesspits. Those special constructions should be visible in the detailed map 4.1. Those drawings should include all necessary quotes taken from the topographic survey and match with to the overall sewer network.

4.7 Narrative about septic tank (type of tank, precise size calculation based on users and type and maintenance instruction).
Detailed drawings (CAD) of septic tanks. Those drawings should include all necessary quotes taken from the topographic survey and linked to the overall sewer network.

4.8 Text information about "Do No Harm principles" adhered to for the surrounding environment (i.e., desludging options, connection to existing city drainage system, existing wastewater treatment units, rainwater discharge solutions).
Reflected/clarified to all stakes holders an as well in the HLP agreement

4.9 Programme design, including all the programme phases with precise period and defined activities and actions to ensure the quality and results.

4.10 Precise BoQ clearly linked to the above-mentioned documents (drawings, maps, nomenclature).

5. Safer / Improved Access to Services Using Solar Lighting Programme implementation

5.1 Layout map of the area including all locations for the solar lights (approximate scale range 1:100 to 1:5000 depending on the site/project size). This map is necessary if changes occurred compared with the project proposals.
Maps have to be produced on CAD or GIS support (not Google Earth).
The maps should include/display:

- Clear title with project name and location name of site.
- Date.
- Name or/and logo of organization.
- Scope of location, where solar lights are planned.
- The legend should be present, indicating all the important elements visible in the map (roads, WASH, marked, schools).

- Scale bar.
- Short text with key elements (bullet points, i.e. qty of solar lights, model, and specifications).

5.2 Detailed drawings of structure of light (including basement) and description of elements (CAD). Those drawings are necessary if changes occurred compared with the project proposals.

5.3 Programme design, including all the programme phases with precise period and defined activities and actions to ensure the quality and results.

5.4 Precise BoQ clearly linked to the above-mentioned documents (drawings, maps, nomenclature).

Draft version as of 27 May 2021, this is a living document and could be better developed accordingly.