



EU PROJECT PREPARATION FACILITY

PPF-Serbia's perspective for sustainable growth



Ministry of European
Integration

Ministry of Finance
Department for
Contracting and Financing
of EU Funded Projects



This project is funded
by the European Union

Osnove prečišćavanja komunalnih otpadnih voda Šabac, Jul 2018



PROJECT PREPARATION FACILITY PROJECT (PPF6)

All documents, information, materials and
pictures available for download @

www.ppf6.rs



Zagađujuće materije u vodama

Vrste zagađujućih materija

- **Rastvorene**
 - **gasovi** (CO_2 , NH_3 , CH_4 ...)
 - **neorganske soli** (NO_x , NaCl , PO_4 ...)
 - **organske materije** (šećeri, alkoholi, estri...)
- **Čvrste**
 - **taložive** ($\rho > 1$)
 - **plutajuće** ($\rho < 1$)
 - **suspendovane**
- **Patogeni (izazivači bolesti)**
 - **bakterije**
 - **virusi**
 - **paraziti**

Tipovi zagađenja

- **Primarno**
 - **organski ugljenik (org C)**
 - **nejonizovani amonijak (NH_3)**
 - **teški metali, farmaceutici, pesticidi**
- **Sekundarno**
 - **azot (N)**
 - **fosfor (P)**

Zakonodavstvo u Republici Srbiji i Evropskoj uniji

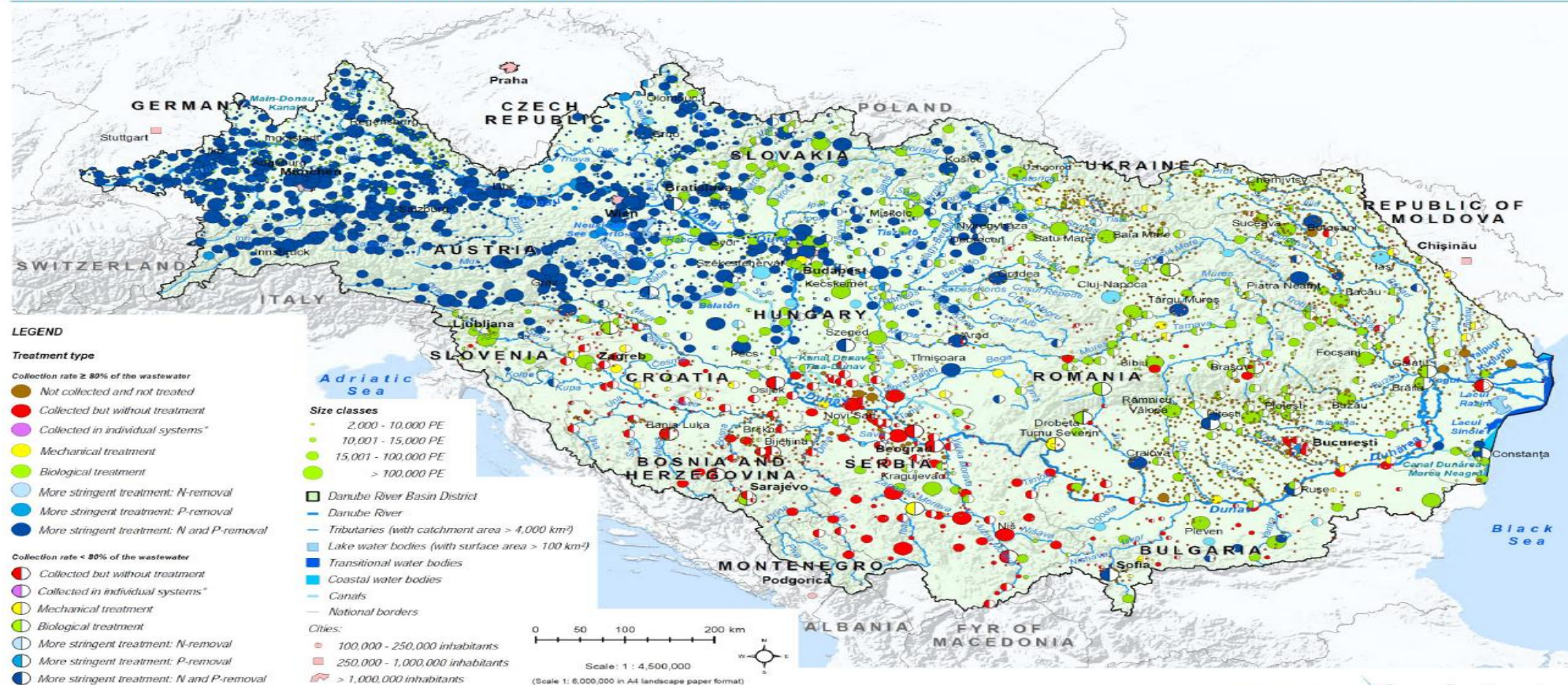
	Austrija	Nemačka	EU
1.) Uklanjanje C	sva PPOV	sva PPOV	> 2.000
2.) Nitrifikacija	sva PPOV	> 5.000	- ¹⁾
3.) Denitrifikacija	> 5.000	> 5.000	- ¹⁾
4.) Uklanjanje P	> 1.000	> 20.000	- ¹⁾

¹⁾ u oblastima osetljivim na eutrofikaciju za >10.000 ES

Postojeći tretman komunalnih otpadnih voda u Republici Srbiji i zemljama u okruženju

Urban Wastewater Treatment – Reference Situation 2011/2012

DRBM Plan - Update 2015 - MAP 5



* Individual or other appropriate systems.
This ICPR product is based on national information provided by the Contracting Parties to the ICPR (AT, BA, BG, CZ, DE, HR, HU, ME, MD, RO, RS, SI, SK, UA) and CH. EuroGisballast data from EuroGeographics was used for all national borders except for AL, BA, ME where the data from the ESRI World Countries was used; Shuttle Radar Topography Mission (SRTM) from USGS Seamless Data Distribution System was used as elevation data layer; data from the European Commission (Joint Research Center) was used for the outer border of the DRBD of AL, IT, ME and PL.

Vienna, December 2015



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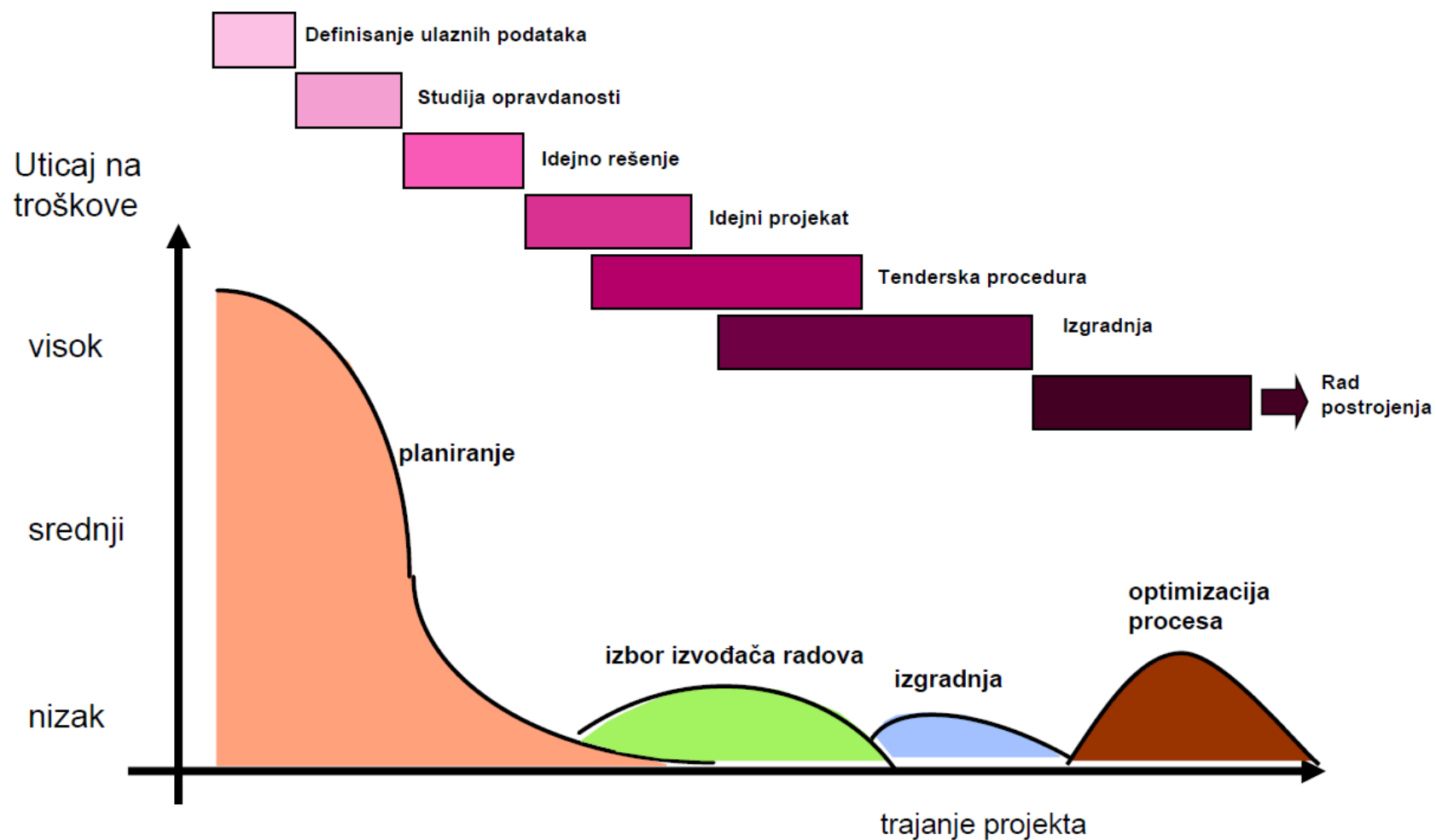
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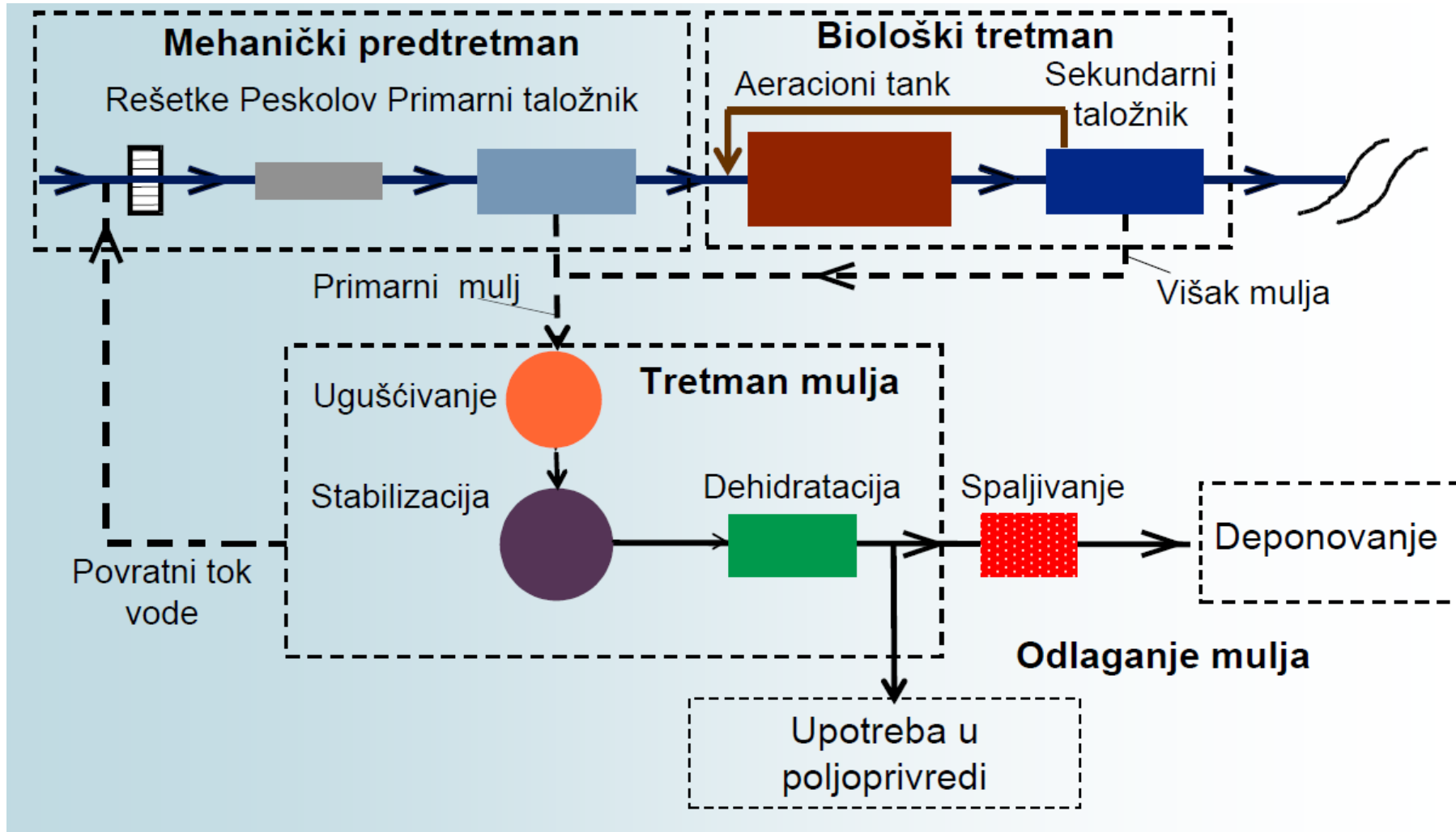


Louis Berger | giz
A project implemented by the contractor Louis Berger and GIZ

Priprema i implementacija projekta



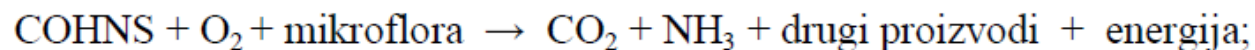
Tehnološke operacije na PPOV



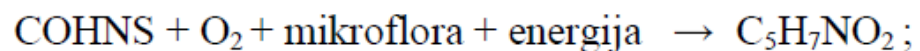
Metaboličke reakcije aktivnog mulja

Metabolizam ugljenika

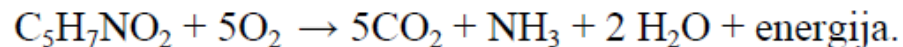
- Reakcija disimilacije, tj. oksidacije organske materije



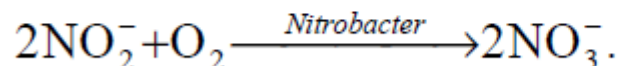
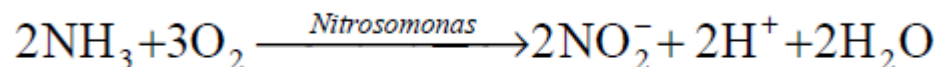
- Reakcija asimilacije, tj. sinteze novih ćelija mikroflora (sa opštom formulom $\text{C}_5\text{H}_7\text{NO}_2$)



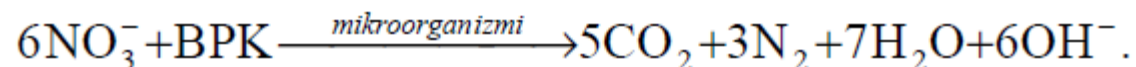
- Reakcija autooksidacije, tj. endogena respiracija ćelija mikroflora



Nitrifikacija



Denitrifikacija



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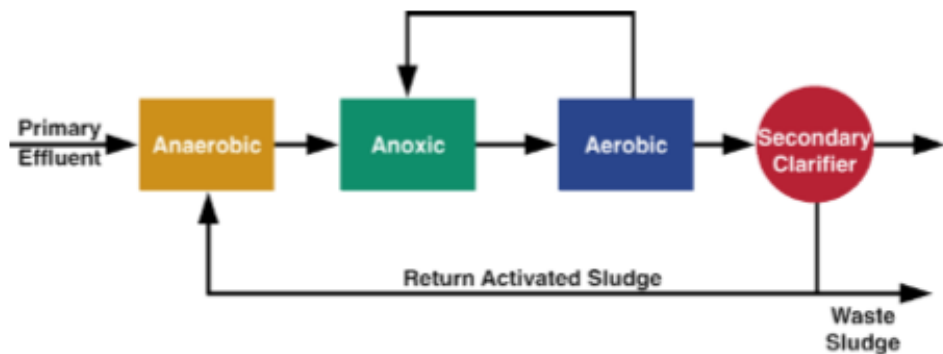
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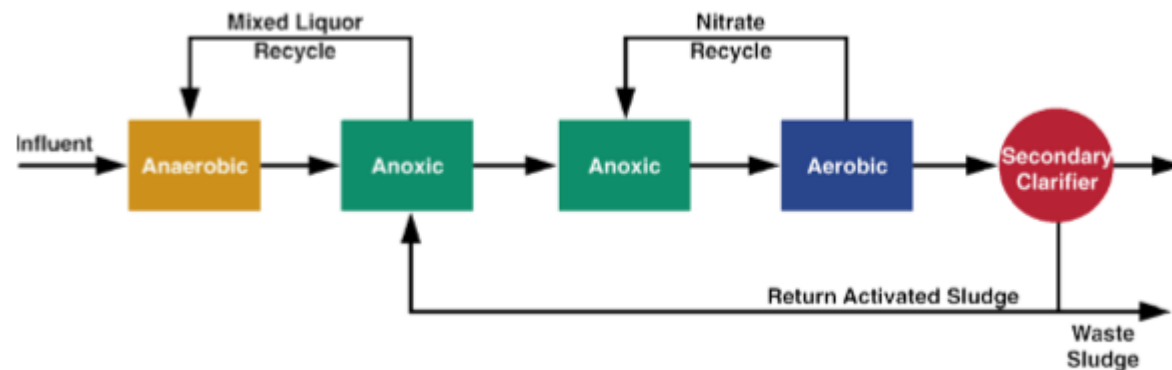
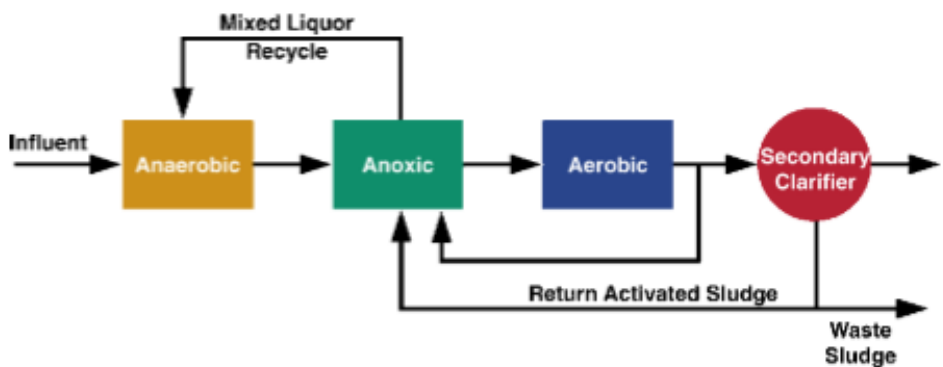
A project implemented by the
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Procesi nitrifikacije/denitrifikacije i biološkog uklanjanja fosfora

A²O



UCT



Procesi stabilizacije, dehidratacije i daljeg tretmana mulja

- **Aerobna stabilizacija**
 - naknadna
 - simultana (extended aeration)

- **Anaerobna stabilizacija**
 - mezofilna ($t = 35 - 37\text{ °C}$)
 - obuhvata procese hidrolize, acidifikacije, acetogeneze i metanogeneze

- **Končno zbrinjavanje mulja**
 - imperativ je očuvanje rezervi P
 - odlaganje, upotreba u poljoprivredi, kospaljivanje sa otpadom, monoinsineracija



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PPOV Nikšić – 103.000 ES

A₂O konfiguracija + anaerobna digestija mulja + CHP



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PPOV Kotor Tivat - 72.000 ES

SBR tehnologija + aerobna stabilizacija mulja



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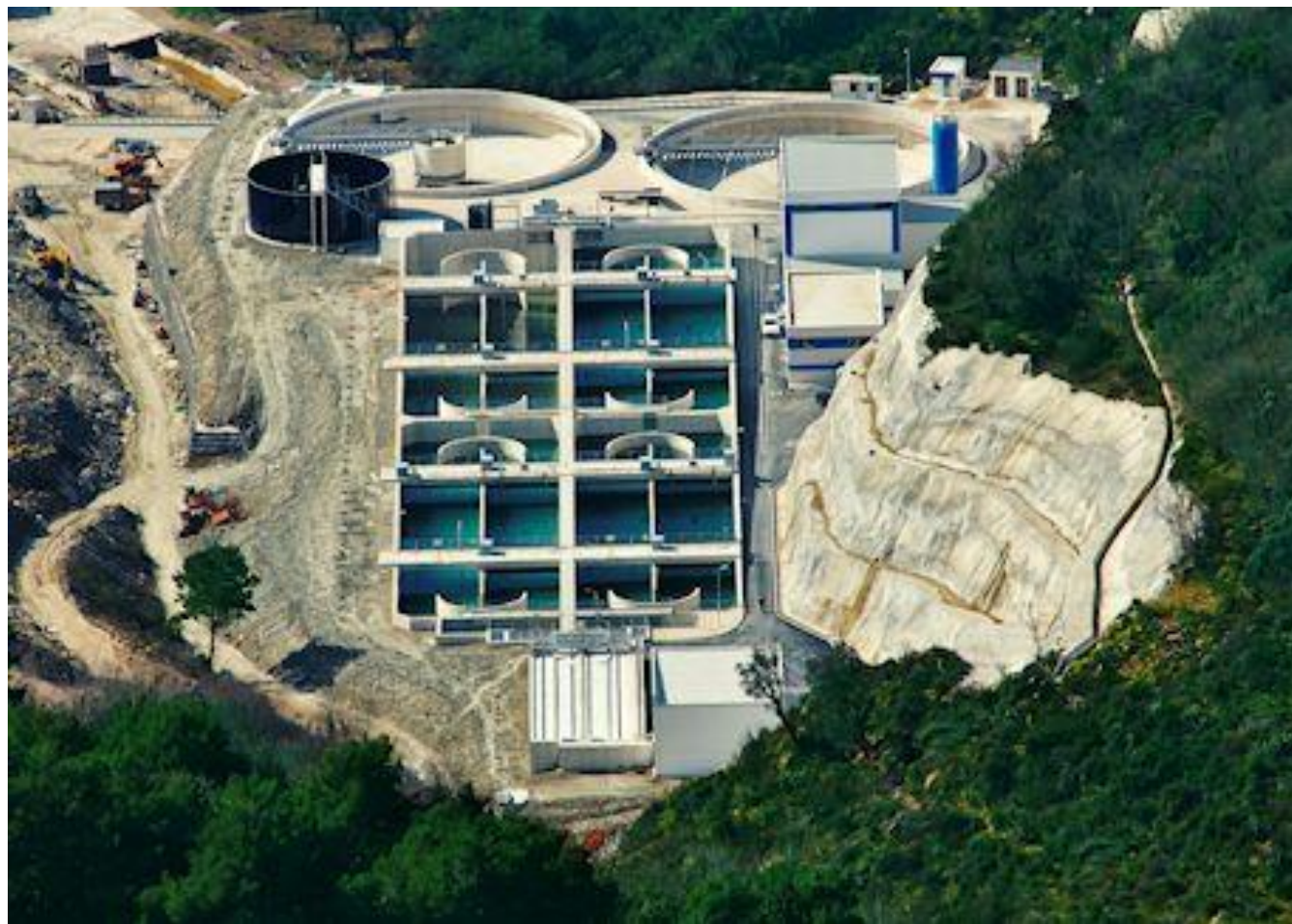


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PPOV Budva - 100.000 ES

Extended aeration



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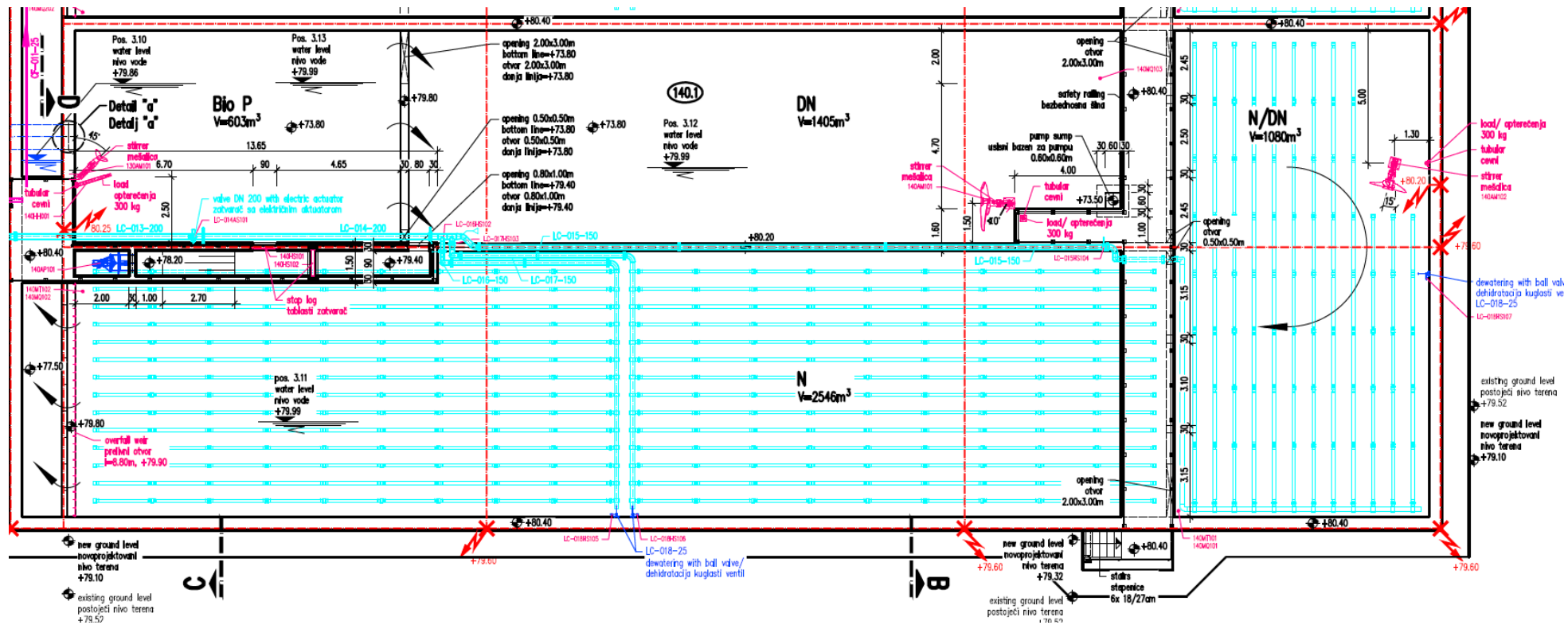


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A₂O konfiguracija + extended aeration





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Hvala na pažnji

