

 	<p align="center"><b>DESCRIPCIÓN BIBLIOGRÁFICA DEL TRABAJO FIN DE ESTUDIOS IKASKETEN AMAIERAKO LANARI BURUZKO BIBLIOGRAFIAREN DESKRIBAPENA</b></p>	<p align="center">PC 934 ANX1</p>
---	--	-----------------------------------

<b>Campos OBLIGATORIOS / NAHITAEZ bete beharreko eremuak</b>	
<b>AÑO / URTEA (20xx):</b> 2016	<b>Trabajo Fin de Grado (TFG) / Gradu Amaierako Lana (GAL)</b> <input checked="" type="checkbox"/> <b>Trabajo Fin de Máster (TFM) / Master Amaierako Lana (MAL)</b> <input type="checkbox"/>
<b>Título del TFG/TFM / GAL/MALaren izenburua:</b> Dimensionamiento de un tanque de tormenta en el barrio Soto-Lezkairu (Pamplona), para el cumplimiento del Real Decreto 1290/2012 del 7 de septiembre.	
<b>Autor (Apellidos, Nombre) / Egilea (Deiturak, izena):</b> Guelbenzu Escudero, Aitor	
<b>Director / Zuzendaria:</b> Goñi Garatea, Mikel	<b>UPNA / NUP</b> <input checked="" type="checkbox"/> <b>Otro (Indicar) / Beste bat (Jarri)</b>
<b>Codirector, si existe / Zuzendarikidea, halakorik badago</b> 	<b>UPNA / NUP</b> <input type="checkbox"/> <b>Otro (Indicar) / Beste bat (Jarri)</b>

<b>Inglés Ingelesa</b>	<table border="1" style="width: 100%;"> <tr> <td data-bbox="288 934 1484 994" style="background-color: #d3d3d3;"><b>Abstract (Resumen de 100-250 palabras) / Abstract (Laburpena 100-250 hitzetan)</b></td> </tr> <tr> <td data-bbox="288 994 1484 1816"> <p>In the last years Spain has started to be conscious about the importance of the quality of the spills in different aquatic systems. That is the reason why a lot of progresses in water management of the sewerage and urban drainage has being made, having as aim to reduce the spillages to the half recipient and, on this way, to reduce the impacts on the aquatic ecosystems in storm episodes.</p> <p>In front of this issue of spill, it was created the “Royal Decree 1290/2012 September, 7<sup>th</sup> section 4 bis”. On the article 259 of the Royal Decree before mentioned, it could be read: “with the aim of reducing conveniently de pollution produced in rain times, the owners of urban water spills must put into service the works or installations that allow to retain and evacuate adequately towards the station filter system of urban waste water, the first waters of run-off of the network of reparation with high concentrations of pollutants produced in the above mentioned episodes”.</p> <p>Based on the guide lines developed in the Royal Decree, the “Manual nacional de recomendaciones para el diseño de tanques de tormenta” was created. Its recommendations were taken into account to design a “tank of storm” in Soto-Lezkairu (Pamplona). It was necessary to made different hydrological, hydraulic and quality simulations of the sewerage including different returning periods (1.01 years, 2.33 years, 5 years and 10 years) and also different storm periods (2 hours, 4 hours and 6 hours) to design this “tank of storm”. SWMM simulation software was used to find out the most proper volume of this storm tank.</p> </td> </tr> <tr> <td data-bbox="288 1816 1484 1883" style="background-color: #d3d3d3;"><b>Materias o Palabras Clave (máximo 5) / Gaiak edo hitz gakoak (gehienez 5)</b></td> </tr> <tr> <td data-bbox="288 1883 1484 2009">           Tank of storm, quality, Soto-Lezkairu, SWMM, Dimensioning         </td> </tr> </table>	<b>Abstract (Resumen de 100-250 palabras) / Abstract (Laburpena 100-250 hitzetan)</b>	<p>In the last years Spain has started to be conscious about the importance of the quality of the spills in different aquatic systems. That is the reason why a lot of progresses in water management of the sewerage and urban drainage has being made, having as aim to reduce the spillages to the half recipient and, on this way, to reduce the impacts on the aquatic ecosystems in storm episodes.</p> <p>In front of this issue of spill, it was created the “Royal Decree 1290/2012 September, 7<sup>th</sup> section 4 bis”. On the article 259 of the Royal Decree before mentioned, it could be read: “with the aim of reducing conveniently de pollution produced in rain times, the owners of urban water spills must put into service the works or installations that allow to retain and evacuate adequately towards the station filter system of urban waste water, the first waters of run-off of the network of reparation with high concentrations of pollutants produced in the above mentioned episodes”.</p> <p>Based on the guide lines developed in the Royal Decree, the “Manual nacional de recomendaciones para el diseño de tanques de tormenta” was created. Its recommendations were taken into account to design a “tank of storm” in Soto-Lezkairu (Pamplona). It was necessary to made different hydrological, hydraulic and quality simulations of the sewerage including different returning periods (1.01 years, 2.33 years, 5 years and 10 years) and also different storm periods (2 hours, 4 hours and 6 hours) to design this “tank of storm”. SWMM simulation software was used to find out the most proper volume of this storm tank.</p>	<b>Materias o Palabras Clave (máximo 5) / Gaiak edo hitz gakoak (gehienez 5)</b>	Tank of storm, quality, Soto-Lezkairu, SWMM, Dimensioning
<b>Abstract (Resumen de 100-250 palabras) / Abstract (Laburpena 100-250 hitzetan)</b>					
<p>In the last years Spain has started to be conscious about the importance of the quality of the spills in different aquatic systems. That is the reason why a lot of progresses in water management of the sewerage and urban drainage has being made, having as aim to reduce the spillages to the half recipient and, on this way, to reduce the impacts on the aquatic ecosystems in storm episodes.</p> <p>In front of this issue of spill, it was created the “Royal Decree 1290/2012 September, 7<sup>th</sup> section 4 bis”. On the article 259 of the Royal Decree before mentioned, it could be read: “with the aim of reducing conveniently de pollution produced in rain times, the owners of urban water spills must put into service the works or installations that allow to retain and evacuate adequately towards the station filter system of urban waste water, the first waters of run-off of the network of reparation with high concentrations of pollutants produced in the above mentioned episodes”.</p> <p>Based on the guide lines developed in the Royal Decree, the “Manual nacional de recomendaciones para el diseño de tanques de tormenta” was created. Its recommendations were taken into account to design a “tank of storm” in Soto-Lezkairu (Pamplona). It was necessary to made different hydrological, hydraulic and quality simulations of the sewerage including different returning periods (1.01 years, 2.33 years, 5 years and 10 years) and also different storm periods (2 hours, 4 hours and 6 hours) to design this “tank of storm”. SWMM simulation software was used to find out the most proper volume of this storm tank.</p>					
<b>Materias o Palabras Clave (máximo 5) / Gaiak edo hitz gakoak (gehienez 5)</b>					
Tank of storm, quality, Soto-Lezkairu, SWMM, Dimensioning					

Campos OPTATIVOS / AUKERAKO eremuak

**Abstract (Resumen de 100-250 palabras) / Abstract (Laburpena 100-250 hitzetan)**

En los últimos tiempos se está cogiendo conciencia en España sobre importancia de la calidad de los vertidos a los diferentes sistemas acuáticos. Es por ello que se están produciendo numerosos avances en la gestión de las aguas de las redes de saneamiento y drenaje urbano teniendo como objetivo reducir los vertidos al medio receptor y así reducir impactos en los ecosistemas acuáticos en episodios de tormentas.

Ante esta problemática de vertidos se crea el Real Decreto 1290/2012 del 7 de septiembre. En la sección 4º bis del artículo 259 del citado Real Decreto se expone lo siguiente, “con el fin de reducir convenientemente la contaminación generada en episodios de lluvia, los titulares de vertidos de aguas residuales urbanas tendrán la obligación de poner en servicio las obras o instalaciones que permitan retener y evacuar adecuadamente hacia la estación depuradora de aguas residuales urbanas las primeras aguas de escorrentía de la red de saneamiento con elevadas concentraciones de contaminantes producidas en dichos episodios”.

Consecuencia de dicho Real Decreto nace el “Manual nacional de recomendaciones para el diseño de tanques de tormenta” y que se tiene como referencia para el dimensionamiento de un tanque de tormenta para el barrio de Soto-Lezkairu (Pamplona). Para el dimensionamiento del tanque de tormenta de Soto-Lezkairu se realizan diferentes simulaciones hidrológicas, hidráulicas y de calidad de la red de saneamiento existente para diferentes periodos de retorno (1.01 años, 2.33 años, 5 años, y 10 años) y diferentes duraciones de tormenta (2 horas, 4 horas, 6 horas) mediante el programa de simulación SWMM para poder así encontrar el volumen adecuado del tanque de tormenta.

Castellano  
Gaztelania

**Materias o Palabras Clave (máximo 5) / Gaiak edo hitz gakoak (gehienez 5)**

Tanque de tormenta, calidad, Soto-Lezkairu, SWMM, dimensionamiento

<b>Euskera</b> Euskara	<b>Abstract (Resumen de 100-250 palabras) // Abstract (Laburpena 100-250 hitzetan)</b>
	<p>Azken urteetan Espainiar estatua kontzientzia hartzen ari da sistema akuatikoetan ematen diren kalitate isurpenetan. Horregatik, aurrerapen asko egin dira saneamendu-sareetako kudeaketan eta hiriko drainatze sistemetan helburua ekaitz uneetan isurpenen murrizketan izanik.</p> <p>Isurpenen arazo hau izanik “Real Decreto 1290/2012 del 7 de septiembre” egiten da. 259. artikuluko 4 bis sekzioan Errege Dekretuak ondorengoa dio, “ euri orduetan sortutako isurpenak komenigarri murrizteko, hondakin-uretako titularrek beharrezko instalazio edo obra zerbitzuak jartzeko obligazioa izanen dute euri orduetan sortutako lehenengo ur kontaminatuak gorde eta depuradoretara bideratzeko”.</p> <p>Errege Dekretuaren ondorioz “Manual nacional de recomendaciones para el diseño de tanques de tormenta” sortu zen, eta erreferentzia gisa erabili da Soto-Lezkairuko ekaitz deposituaren dimentsionamendua egiteko. Soto-Lezkairuko ekaitz deposituaren dimentsionamendua egiteko simulazio hidrológico, hidrauliko eta kalitate simulazioak egin dira errepikatze-denbora desberdinentzako (1.01 urte, 2.33 urte, 5 urte, 10 urte) eta ekaitz iraupen desberdinentzako (2 ordu, 4 ordu eta 6 ordu) SWMM programaren bitartez eta deposituaren dimentsio egokiena aurkitzeko.  </p>
	<b>Materias o Palabras Clave (máximo 5) / Gaiak edo hitz gakoak (gehienez 5)</b>
	Ekaitz-depositua, kalitatea, Soto-Lezkairu, SWMM, dimentsionamendua
<b>Otro Idioma</b> Beste hizk. bat	<b>Abstract (Resumen de 100-250 palabras) // Abstract (Laburpena 100-250 hitzetan)</b>
	<b>Materias o Palabras Clave (máximo 5) / Gaiak edo hitz gakoak (gehienez 5)</b>