Kepetingan River is one of important River in Sidoarjo. A Fishermen could sail through the river. Moreover, the river becomes an important place in earning cost living by the river transportation service provider. Yet, currently the river has a problem deals with sedimentation due to mud and rubbish thrown by local people. According to that problem, this final assignment is trying to manage solution by creating a concept design of cleaning vessel with Backhoe Dredger's type. The first step in process design is looking for the main dimension by using optimization method. The optimization method is aim to minimize an operational and building cost in the first year. Furthermore, based on that main dimension, the economical and technical operational is done to analyze. According to the optimization result, the main dimension gained is: L=16.24 m, B=5.86 m, H=2.10 m, T=0.72 m. By using that main dimension, the general arrangement of Backhoe Dredger is presented.

**Keywords:** Kepetingan River, Backhoe Dredger, Concept Design