

1. Project on upgrading the route on Mong Cai River from Van Gia to Ka Long bridge (Quang Ninh province):

a. Features of the route

- Mong Cai river is 17Km long (from Van Gia - Ka Long bridge), flowing through the territory of Mong Cai city, consisting of 02 following sections:

+ Section from Ka Long bridge to Red Mountain is 10.8Km long (internal section): This section has particular characters of mountainous rivers, which is strongly influenced by tides. Morphology of the coastal route is clear and stable. The two riversides are low hills between narrow plains and mangrove forests.

+ Section from the Red Mountain to Van Gia (confluence of Vinh Thuc navigation channel) is 6.4 Km long (external section) has characteristics of the estuary on the tidal flat. Morphology of coastal route is difficult to determine.

- In recent years, due to strong growth in the socio-economic sector, navigation activities on Mong Cai River has unusual mutations. In such a situation, congestion on the route is a frequent phenomenon, accompanied by riverside landslide, environmental pollution, causing significant loss of both assets and people in both sides of the river. Therefore, upgrading Mong Cai waterway route is an essential solution.

b. Topography:

Based on the topographic characteristics and morphology of Mong Cai river, the route could be divided into two following sections:

- Section from Ka Long bridge to the Red Mountain is 10.8Km long: The average height from + 2.5m both sides to + 3.5m (According to state's height system). Particularly, the section near Mong Cai town, at some locations of the riverbank, local residents proceeded embankment for housing, open wharfs on the shoreline affecting navigation safety. Natural width of the river is about 70m to 100m. Along the river, many small shallow river rapids and waterfalls, typically Xuan Ninh, Han waterfalls (about 2.8 - 3.2 km from Ka Long Bridge) make the channels circuitous, narrow and shallow, causing serious obstacles for waterway navigation. Bottom height at many sections is much higher than the low water level P95%.

- Section from the Red Mountain to Van Gia (confluence of Vinh Thuc navigation channel) is 6,4Km long: It has characteristics of estuaries flowing on tidal flats. The morphology is difficult to determine. Axial dynamics of navigation channel and natural navigation channel for shipping are instable and frequently occur changes in areas bordering with internal and external sections after each flood season and the area outside Mui Ngoc, which borders with Van Gia - Vinh Thuc navigation channel. The average height of the bottom reaches from -2,5m - 3.5 m (According to state height system).

c. Current status of the navigation channel and route

- The navigation channel of Mong Cai River is currently classified grade IV under the inland waterway standards TCVN5664-2009.

- The navigation channel and water areas before ports and terminals are completely based on the natural conditions of the river. The installation of new signaling system has just been invested in recent years.

- Based on survey data of 2010, the entire route has 15 bends, including:

+ The external section (from Van Gia estuary to Red Mountain port) has 03 bends, the smallest curvature radius is $R_{min} = 126m$.

+ The internal section (from Nui Do port to Tho Xuan port) has 12 bends. Most of them have a curvature radius of 217m. Particularly, the section between Han waterfall and Xuan Ninh waterfall has 3 bends with the smallest curvature radius $R_{min} = 77 - 130m$.

+ On the entire route, almost navigation channels need to be dredged.

- Mong Cai river is currently operated in the natural conditions. For internal section from Nui Do port to Minh Thang port (the downstream of Kalong bridge), the riverbed is narrow, navigation channels on the entire route are shallow. During low tides, only ships of 3-5T can navigate on this section. For external section from Van Gia to Red Mountain port, the riverbed is wide, navigation channels are better than the internal section. However, during low tides, only ships of 5-10T can navigate, ships of bigger tonnage have to wait till high tides for throughput.

- On the route, there are 03 port complex (including Red Mountain Port, Tho Xuan port and Ninh Duong port).

d. The necessity of investment

- Mong Cai river flowing in the direction of north - south is the main waterway route, playing a key role in the inland waterway system of Quang Ninh province in general and Mong Cai City in particular; It is the most favorable route to transport imported goods from Vietnam to China and vice versa. Besides, it is an important flood drainage gate of Mong Cai City.

- Transport activities on the river motivate socio-economic development of Quang Ninh, Hai Phong and other provinces in key economic triangle around the Gulf of Tonkin.

- Mong Cai River from Van Gia to Ka Long bridge is a part of Hai Phong - Ha Long - Cua Ong - Van Gia - Mong Cai inland waterway route. Particularly, the section from Van Gia to Ka Long is entirely located in Quang Ninh province. However, the cargos transported on the route almost originated from the Red River Delta provinces and the transited cargos

from Cai Lan, Hai Phong and Van Gia ports. As the result, the most fascinating area of the route are all of the provinces within Red River Delta.

e. Scale and solutions for upgrading navigation channels

- Specify standards for navigation channel: Invest in upgrading navigation channel of grade III with the following norms:

- + Self-propelled ships of 600T
- + Wide of the channel: B= 50m; H=3,5m.
- The regulation works include:
 - + Dredging of the entire route: 1.000.000m³
 - + Construction of river protection embankment: 4.000m
 - + Upgrading signaling system

f. Total investment:

- Temporarily calculated total investment: 560 billion dong
- + Estimated non- public capital: 448 billion dong
- + State's budget (ground clearance, project management, consulting, etc.): 112 billion dong

g. Form of investment: BOT

h. Expected payback period: 25 year

i. Revenue sources of the project

- Collect charges from the waterway vehicles navigating through the channel
- Collect charges from the cruise vessels
- Revenue from the use of dredged products (sand, gravel ...)

k. Planned implementation period: 2016-2017

m. Recommendation: To ensure the feasibility of project, the state is proposed to support 1/3 funding of the total investment.