

**Legislative Council Panel on Transport
Subcommittee on Matters Relating to Railways**

Enhancement of Light Rail Service

Background

Since the commissioning of Light Rail (LR) in 1988, it has been serving the community for thirty years, witnessing the development of New Territories West, and serving commuters travelling between Tuen Mun and Yuen Long Districts (including Tin Shui Wai). On average daily, it carries around 500,000 commuters. To cope with the increasing patronage and passenger need, the MTR Corporation (the Corporation) has continuously invested resources in the enhancement of LR service and facilities. In the Public Transportation Strategy Study (the Strategy Study) released in June last year, the Government has reaffirmed the role of LR as an important rail-based and at-grade transport mode in Yuen Long and Tuen Mun, as well as a feeder to the West Rail Line (WRL). The Government is working with the Corporation in implementing the various measures mentioned in the Strategy Study that serve to enhance the LR carrying capacity and operational efficiency.

2. The paper briefs Members on the measures on the enhancement of LR service and the latest progress of its implementation.

Continuous Enhancement of LR Facilities and Services

3. LR system covers 12 routes and 68 stops (155 platforms in total) with a total route length of 36.15km. Compared with the operation in 2008 just after the merger of the Corporation, the patronage of LR has increased by 30%. The daily average number of Light Rail Vehicles (LRVs) running in morning peak hours has also gone up from 116 to 134. The total daily number of LR trips today is around 3 000, translating into around 10% increase compared with that in 2008. The Corporation places importance on the needs of community. Since its merger, the Corporation has introduced a number of measures to improve platform environment, passenger information display, as well as to facilitate passengers using barrier-free facilities. These measures include:

a) **Increase the number of LRVs:** At present, there are 140 LRVs in the fleet. The Corporation awarded a contract of more than \$700 million in 2016, to procure 40 new LRVs, among which 30 will be used to replace the existing Phase 2 LRVs while the other 10 will be used to expand the fleet. The new LRVs are expected to be put into service progressively from 2019 to 2023.

b) **Improve LR platform facilities:** Since the merger, the Corporation has also made progressive improvement in the platform facilities such as retrofitting additional entrances at platforms (e.g. Choy Yee Bridge Stop, Tin Yuet Stop and Yuen Long LR Terminus); providing tactile guide paths, providing seats on platform and platform gap fillers at boarding positions, and upgrading the passenger information display on platforms. The Corporation has also completed the refurbishment of Tai Tong

Road Platform 2 in 2015 to widen the platform space for passengers. The Corporation is also engaging in the preparatory work for the platform widening project at Tin Shui Wai Stop (platform 3), Tai Tong Road Stop (platform 1) and Lam Tei Stop (platform 2);

c) **Extend LR service hours:** Taking into account passenger needs, the Corporation has extended LR service hours in late night since 2014, so that passengers taking the last WRL train could still be able to catch the last LR train to travel to all LR stops in the network; and

d) **Enhance ticketing arrangement:** In 2015 and 2016, the Corporation replaced all single-journey ticket selling machines with the new “2-in-1” ticket machine with octopus add-value service in the whole LR network. This year, the Corporation also starts replacing around 1,500 Exit/Entry Fare Deduction Processors and Enquiry Processors at over 150 platforms in the LR system. All these measures serve to facilitate passengers’ use of LR service.

Enhancing Carrying Capacity

4. In the face of the patronage growth arising from the development of Tuen Mun and Yuen Long community, apart from improving facilities continuously and extending service hours, the Corporation has been adjusting its service planning, LRV deployment and other measures to boost the LR carrying capacity, taking into account passengers’ travel patterns and the loading of LR routes. Such measures aim to reduce passengers’ waiting time and journey time during the morning peak hours.

5. Improvement measures include increasing train frequencies, slotting in short-haul special runs¹ to ease congestion, deploying more coupled-set LRVs (more coupled-set trips are added in 9 routes since 2015), enhancing platform management, etc.. Since 2014, the Corporation has deployed 70 additional platform assistants to assist passengers in boarding and alighting trains. Currently, 150 assistants are deployed to serve during morning peak hours in the network. The Corporation also rearranged the setting of Exit/Entry Fare Deduction Processors and widened platform spaces to facilitate passenger boarding and hence on-time departure of LRVs, thus improving the overall carrying capacity. For details of the measures, please refer to the [Annex](#).

Implementing Measures in the Strategy Study

6. The population in the New Territories West has been increasing in recent years. In view of the crowdedness of LR network during peak hours, the Government, together with the Corporation, conducted a systematic review on the long-term development of LR services last year and the Strategy Study then recommended short, medium and long term² measures for enhancing the carrying capacity and alleviating crowdedness of LR.

¹ Including route 505、507、614、614P、615P、751、705、706

² The following measures for short, medium and long term are proposed in the Strategy Study –
Short-term measure - (a) purchasing ten additional LRVs ; (b) rationalising some LR routes ; and (c) adjusting traffic lights at busy junctions

Medium-term measures - (d) undertaking a study on design improvements for busy junctions.

Long-term measures - (e) improving the long-term operation model of the Yuen Long Main Road of the LR; and ; (f) undertaking a long-term study of the feasibility of constructing a heavy rail to connect Northwest New Territories and the urban areas.

LR Route Rationalisation Proposal

7. The LR adopts an open design and has to share certain space of the roads with other road users. Hence, the punctuality of LR trips is affected by factors including road traffic condition, waiting time at traffic lights and road junctions. For LR stops of overlapping routes, it is common that two or more LRVs travelling in the same direction would arrive simultaneously. Then it takes a long while for the next LRV to arrive. This results in uneven distribution of headway, causing inconvenience to passengers. It may result in more bottlenecking and congestion if more LRVs were deployed to these routes, causing LRVs not being able to arrive at stops on time. The overall carrying capacity could not be maximised.

8. In view of the situation, the Strategy Study puts forward a proposal on rationalising certain LR routes. By reducing the number of overlapping long-haul trips while increasing short-haul ones running within Tuen Mun and those running between Siu Hong and Yuen Long, the headway could be more evenly distributed, thus alleviating the problem of crowdedness, and shortening the overall travelling time of passengers (including long and short hauls, and cross-region). The positive effect gained from the deployment of the ten new LRVs aforementioned in paragraph 3(a) above as well as the overall increment in carrying capacity could also be maximised by the reasonable adjustment of operations and route arrangement in some busy road sections. To complement the route rationalisation proposal, the Corporation will also increase resources in areas such as providing more coupled-sets, increasing manpower and enhancing relevant facilities.

9. Community support is essential for the successful implementation of the proposal. In July and September 2017, the Government and the Corporation had presented the proposal to Tuen Mun District Council (DC) and Yuen Long DC and listen to DC Members' views on the route rationalisation arrangement. Some Members agreed that the proposal would help relieve road congestions, while some expressed reservation and even disagreement over the proposal. They were mainly concerned about the interchange arrangement and its potential impact, whether the proposal could cater for the needs of various passenger groups, and that the proposal should not affect the existing service in other LR routes. A number of DC members considered that adding more LRVs is the most direct approach to enhance the carrying capacity. Moreover, some relayed that more road space for other road users can be released if the LR track currently located at Yuen Long Main Road could be partially or fully realigned to release

10. The Corporation and the Government are studying the views collected and are revisiting the proposal with a view to fine-tuning it. Hopefully, we could come up with a revised proposal that serves to balance the needs of different stakeholders. We will consult the DC again on the proposal in due course.

11. As regards short-term measures, the Strategy Study also suggests to adjust the traffic lights at three busy junctions. The Government has carried out adjustment work at one of the junctions³, so that LR can enjoy priority in passing the junction. Adjustment work to the traffic lights at the other two junctions⁴ will be carried out within this year. It is

³ Tin Ho Road / Tin Yiu Road

⁴ Tin Shui Road/ Tin Wing Road (near the Tin Shui Wai Hospital); and Tin Fuk Road / Tin Yiu Road/ Ping Ha Road

expected that such arrangements will alleviate the traffic congestion problem which further affects the speed and headway of LR.

12. The Government is also following up on the medium and long-term measures as recommended in the Strategy Study. The Highways Department (HyD) is gearing up to commence a feasibility study this year on design improvements for busy junctions to alleviate the need for LR to share road with other road users. The feasibility study will take two years to complete. After completing the feasibility study, HyD will, with the assistance of the Transport Department, look for measures to improve the mode of operation of LR along Yuen Long Main Road in the long-run.

13. As a long-term measure, the Government will conduct the “Strategic Studies on Railways and Major Roads beyond 2030” (RMR2030+ Studies) upon the availability of funding. Among other things, the RMR2030+ Studies will focus on the loading of the heavy rails in the Northwest New Territories (NWNT) beyond 2030 according to the planning data up to 2041. Based on the forecast demand, we will carry out studies on whether it is necessary to construct a new heavy rail to directly connect NWNT to urban areas.

Conclusion

14. The Government and the Corporation will continue to follow up on the various measures proposed in the Strategy Study, and increase resource allocation, with the aim to enhance LR carrying capacity and meet the community’s transportation needs. As one of the major public transport operators in the New Territories West, the Corporation will continue to improve LR service, making LR closely connected with the

community development. The Corporation also seeks to secure the support from the community on the route rationalization proposal, enabling LR services to better serve the needs of the public.

15. Members are advised to take note of the paper.

**Transport and Housing Bureau
MTR Corporation Limited
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Measures to increase the carrying capacity of the Light Rail

(As extracted from Annex 4 of the “Public Transport Strategy Study” in June 2017)

Increase in frequency

The MTRCL increases the frequency of the Light Rail service during peak and non-peak hours where practicable. Since 2009, 22 newly purchased LRVs had been delivered to Hong Kong by batches, and all of them were put into service by 2011. The number of LRVs in service was increased from 118 to 140. Since 2012, Light Rail trips have been added by about 660 per week, increasing the total number of trips from 20 370 to 21 030 per week, which represents an increase of 3%. However, since the Light Rail adopts an open design and has to share certain space of the roads with other road users, the shared road sections impose certain constraints on the number of operating LRVs. Considering the current traffic condition and the capacity of the roads, the utilisation rates of certain road junctions are already very high and the room for increasing the Light Rail service frequency during morning peak hours is rather small.

Layout and design of the LRV compartments

2. There are currently four generations of LRVs in operation. They came into operation at different times and vary slightly in their compartment designs. In particular, the carrying capacity of the Phase 1 LRVs was slightly lower than that of LRVs of the other three generations. The MTRCL completed the refurbishment of the Phase 1 LRVs in 2014. The refurbished compartments are basically the same as those of the Phase 4 LRVs and the average carrying capacity of these LRVs was increased by

about 8%. As for LRVs of the other three generations, since the layouts of the compartments have already enabled the maximum carrying capacity, it would be difficult to further increase the carrying capacity by modifying the layouts of the compartments.

Platform Management

3. The MTRCL strengthens its management of passenger flow at platforms through different measures, including improving the locations of the entry/exit processors and the design of the access at Light Rail platforms, and widening the space for passengers at platforms with very high utilisation rates (such as the Tai Tong Road Stop) where practicable, so that passengers can enter and leave the LRV compartments and platforms more smoothly. This will enable LRVs to depart on time, and thereby raising the overall carrying capacity of Light Rail service.

Short-haul special service

4. The patronage of some sections of individual Light Rail routes is higher (particularly those connecting to the West Rail Line). To enable effective diversions of passenger flow in these busier sections and stops, the best way is to introduce short-haul special service. The MTRCL has introduced short-haul special service to some busier Light Rail sections (including Route Nos. 505, 507, 614, 614P, 615P, 751, 705 and 706) to carry passengers to and from the West Rail Line stations. Nevertheless, the short-haul special service is not applicable to all sections of all routes. The prerequisite is that there should be enough track space between the original scheduled LRV trips to accommodate the extra short-haul special service. Also, similar to addition of ordinary LRV trips, when increasing the short-haul special service, the constraint imposed by the open design of

the Light Rail system on the number of operating LRVs should be considered.

Coupled-set LRVs

5. LRVs can be operated in the form of single-set or coupled-set. Deploying additional LRVs, either single-set or coupled-set, can increase the carrying capacity of the Light Rail. When a coupled-set LRV reaches a stop, passengers can alight from both compartments at the same time. Therefore, a coupled-set LRV can attain higher efficiency and achieve better on-time performance if compared with two single-set LRVs, enhancing the overall operational efficiency and the carrying capacity of the Light Rail. On the other hand, single-set LRVs can be deployed with greater flexibility. Nevertheless, in considering the use of more coupled-set LRVs for certain Light Rail routes or for certain sections of the routes, apart from facilities of a stop, the MTRCL will take into account traffic volume on the road, in particular the utilisation situation of junctions. At present, Light Rail routes pass through a number of busy junctions. At these junctions, the traffic volume is rather high as there are considerable numbers of other vehicles in addition to LRVs. When determining the most effective deployment of LRVs for Light Rail routes passing by these junctions in order to increase the carrying capacity, the MTRCL has to take into account such factors as the waiting time for the traffic lights, the journey time, the carrying capacity of each LRV and the distance between junctions, so as to decide whether coupled-set or single-set LRVs should be deployed for the additional services. Considering the current road situations and capacity, the utilisation rates of certain junctions passed by Light Rail routes are already very high during peak hours. If a large number of additional coupled-set LRVs are deployed during peak hours, the LRVs

may obstruct one another, reducing the overall driving speed and the operational efficiency of the Light Rail. The purpose of increasing the carrying capacity cannot be achieved. The length of a coupled-set LRV is twice as that of a single-set LRV. Coupled-set LRVs take longer time than single-set LRVs when turning or passing through turnouts or inner roads, thus affecting the journey time. To maximize effectiveness of service, the MTRCL has to carefully consider the number of single-set and coupled-set LRVs that can be accommodated by individual Light Rail route.