Selection of Metro Manila BRT Corridors using Multi-Criteria Assessment

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Abstract: A quality mass transit system is indispensable in providing sustainable mobility to people and alleviating traffic congestion in urban areas. As compared to private vehicle travel, public transport is much more efficient on a per person-kilometer basis. A mass transit option is the Bus Rapid Transit system or BRT, a bus–based mass transit system that delivers comfortable and cost-effective mobility through the provision of exclusive right-of-way lanes, thus reducing delays and dwell times. It offers the same performance and amenities as in a modern rail-based system but at a fraction of the cost. The paper evaluates the multiple options for pilot BRT corridors in Metro Manila and recommends adoption of priority BRT corridors. Following an internationally recognized structure for transport scheme appraisal, a multi criteria assessment has been applied using both qualitative and quantitative indicators to identify potential BRT corridor(s) for further development.

Keywords*:* BRT, Bus Rapid Transit, multi-criteria assessment

1. INTRODUCTION

Metro Manila is the center of political, economic, social, and cultural activities. Its population density of about 16,000 persons per sq. km. is one of the highest in Southeast Asia. With a population growth rate that is higher than the national figure and with the spread of urbanization in the north and south of Metro Manila, the intensity of activities is expected to further increase. As host to a concentration of activities, urban problems have become part of the fabric of life in the metropolis.

Traffic congestion is the most visible impact of growing urban problems. The annual economic loss due to congestion in Metro Manila was estimated to be about Php100Billion in year 2001(UP NCTS, 2001). A 2006 estimate showed that this has increased to Php140Billion. A more recent estimate by JICA of the cost of traffic congestion for Mega Manila is 2.4 Billion pesos per day (JICA, 2013). It is brought about by a myriad of factors, foremost of which are rise in motorization that in turn is caused by population increase due to natural growth and in-migration.

The Metro Manila Urban Transport Integration Study (MMUTIS, 2001) shows that in 1996, around seventy-eight percent (78%) of the 23.7 million motorized person trips in a typical day in Metro Manila uses public transportation. This is a rather high mode share for public transport, as compared to Jakarta and Bangkok, with public transport modal shares of 54% and 49%, respectively. Ideally, the high public transport share in Metro Manila should be maintained if not further enhanced. However, this is threatened by growing car ownership and deteriorating levels of service of public transportation. The number of motorcycles has also increased tremendously over the last five years.

A good mass transit system is indispensable in providing sustainable mobility for people and in alleviating traffic congestion in urban areas. As compared to private vehicle travel,

public transport is much more efficient on a per person-kilometer basis. A mass transit option is the Bus Rapid Transit system or BRT. A BRT system is a bus–based mass transit system that delivers comfortable and cost-effective mobility through the provision of exclusive right-of-way lanes, thus reducing delays and dwell times. It offers the same performance and amenities as in a modern rail-based system but at a fraction of the cost

2. OBJECTIVES

The main objectives of the study are to:

a) Evaluate the best arrangements to integrate the proposed BRT approach with other transport modes in a seamless manner; and
b) Evaluate the multiple options and recommend adoption of priority BRT corridors.

3. REVIEW OF MASTER PLANS AND STUDIES

The identification of a suitable BRT demonstration corridor in Metro Manila that will later be subject to a feasibility study warrants a revisiting of mass transit master plans and studies that have been undertaken in the past. Among these are:

3.1 MMUTIS of JICA, 2000

The Metro Manila Urban Transport Integration Study (MMUTIS) of the Japan International Cooperation Agency (JICA) which was completed in March 2000 formulated a transport master plan for Metro Manila for the year 2000-2015. The transport master plan consists of the road network and the mass transit network, among others. Considering the time frame (2000 to 2015), it may be said that not much has been implemented except the linking of LRT 1 north extension to the EDSA MRT at its northernmost station. Even this has yet to be fully operationalized.

3.2 Metro Manila BRT Pre-FS of USAID, 2007

The pre-feasibility study for a BRT system in the Greater Manila Area (USAID, 2007) aimed to identify potential pilot BRT routes and perform a rapid assessment of the feasibility of implementing a BRT system on these identified routes. From an original list of eleven (11) routes, the choice was narrowed down to four (4) and then to two (2).

The criteria for corridor prioritization included the following:

- Passenger demand
- Available right-of-way
- Existing congestion levels
- Adequacy of the existing public transport services
- Potential for growth
- Two intersecting corridors
- Willingness of the local government to host a BRT

The top 2 choices based on these criteria were Line 1 (Lerma – Fairview) and Line 7 (EDSA). But the DOTC indicated at that time that unofficially, Line 1 was already reserved for an LRT system. Furthermore, the DOTC expressed reservation for Line 7 (EDSA) because it already has an LRT system and its financial viability may be compromised by another mass transit system directly competing with it. Consequently, the other 2 short-listed corridors, Line 2 (EDSA- Binangonan via Ortigas Ave.) and Line 3 (C – 5 from SLEX to Commonwealth Ave.) were chosen and subjected to a rapid feasibility assessment.

3.3 Studies for Taguig & Makati: Ayala Land 2009 onwards

In 2009 Ayala Land developed a proposal following the realization that increasing congestion in Makati and the forecast growth in trip generation at the currently under developed Fort Bonifacio would frustrate growth through constraining mobility and consequently frustrating future investment in both cities. The development of the BRT was described in Ayala's Transport Consultants, Parsons Brinkerhoff's, (PB) report, Makati CBD-Bonifacio Global City BRT Feasibility Study: Final Report, January 2009. The BRT proposal was developed following the collapse of plans for a Metro Rail Transit (MRT) extension called the Ayala Loop that would connect the current Ayala MRT station with Makati via a route approximating Ayala Avenue- Buendia Avenue – SM Mall of Asia – Taft Avenue Station. To fund capital cost Ayala approached Asian Development Bank but the project failed to meet its investment criteria. Not to be deterred, Ayala made an unsolicited application to DOTC to build and operate a subsection of Phase One between EDSA and Metropolitan.

4. DEVELOPMENT OF APPRAISAL CRITERIA

After reviewing available materials developed in the last few years regarding BRT in Metro Manila, some indicators (especially those used during the 2007 USAID funded BRT study) were examined. Passenger demand and availability of right-of-way are two of the most important considerations for a BRT corridor to be chosen. Passenger demand must be high enough for its operation to be sustainable. Right-of-way at ground level, on the other hand, must be available so as to dispense with elevated structures which could easily jack up the cost of the system. Except for EDSA, most of the major public transport corridors in Metro Manila are being served by jeepneys. Still considered as a low capacity vehicle, it is the main mode of transportation for many of the commuters in Metro Manila and other suburban areas. During peak periods, despite its thousand numbers running, jeepneys are inadequate to meet passenger demand. Due to frequent stopping in order to load and unload passengers, they have been considered contributory to severe traffic congestion. While it is not the primary purpose of BRT to relieve congestion, it would be beneficial if it helps in decongesting corridors due to the replacement of the numerous low capacity public transport vehicles. Replacement of the old and many vehicles with new and smaller number of BRT vehicles can also reduce the pollution levels on the corridor.

Fewer vehicles on the road could also mean less exposure to road crashes. BRT systems therefore could benefit those corridors which have high road crash incidence.

Better connectivity with other BRT and/or LRT/MRT systems can help improve transfers of commuters. Currently, our mass transit systems appear to be disconnected thereby causing inconvenience to commuters.

Considering these important indicators and consistent with internationally recognized structure for transport scheme appraisal, it is recommended that the appraisal focuses upon the following subject areas:

- Economics
- The environment
- Safety
- Integration
- Accessibility
- Deliverability

Meetings with key government agencies and LGUs were made to help confirm the criteria to be used for the selection of BRT corridors to be subjected to more detailed study. Those who attended the meetings generally agreed with the set of criteria presented to them. It was suggested to add connectivity as a criterion recognizing the problems experienced by many commuters with the existing mass transit systems with poorly planned connectors. Integration (one of the appraisal criteria), therefore, is extended to include connectivity.

4.1 Screening of Potential BRT Corridors

The study initially considered 7 corridors and their variants as shown in Figure 1.

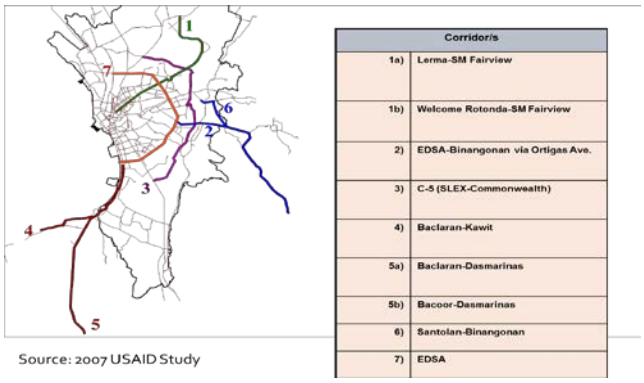

Figure 1. Potential corridors/BRT lines

Table 1 presents some of the major considerations for the initial screening of potential corridors as a result of the meetings with key agencies (MMDA, DOTC and DPWH).

Table 1. Considerations for initial screening of corridors

Corridor		Remarks
1a	Lerma-SM Fairview via Quezon Ave & Commonwealth Ave.	General agreement that this corridor must have a high-capacity & high-quality mass transit.
1b	Welcome Rotonda-SM Fairview via Quezon Ave & Commonwealth Ave.	Within corridor 1a
2	EDSA-Binangonan via Ortigas Ave	General agreement for provision of better mass transit to and from east of Metro Manila; extend to Gilmore/Aurora Blvd.(LRT2)
3	C-5 (SLEX-Commonwealth)	Not generally a PT route but may have high potential for diverted traffic from EDSA; less resistance from transport groups
4	Baclaran-Kawit via Quirino Ave.	May not be considered due to LRT 1 Extension
5a	Baclaran-Dasmarinas via Quirino Ave.	May not be considered due to LRT 1 Extension
5b	Bacoor-Dasmarinas via Aguinaldo Highway	Impact may not be felt in Metro Manila; may be considered as potential feeder to LRT1 extension
6	Santolan-Binangonan via Marcos Highway, Imelda Ave, Ortigas Ave Ext, Manila East Road	May serve as branch for EDSA-Binangonan; LRT2 to extend to Masinag
7	EDSA	May compete w/ MRT3; too many projects for bus operations already in pipeline

Based on meetings with key agencies, namely: DOTC, MMDA, and DPWH, it would appear that the following would be the remaining potential corridors and the subject for a more detailed evaluation:

- Commonwealth Ave/Quezon Ave (1a)
- Ortigas Ave (extended to Gilmore) (2)
- C-5 (3)
- Aguinaldo Highway (outside Metro Manila, and may be a (BRT) feeder to the LRT Line #1 extension at Bacoor). (5)

During a workshop held on June 29, 2012, the DOTC indicated that C-5 would be a subject of an LRT feasibility study and that Aguinaldo Highway would be an LRT feeder to LRT 1 Extension. As possible replacements of the two previously identified corridors, it was suggested to add the following 2 new corridors:

- C – 3; and
- Alabang – Zapote Road

Since Alabang – Zapote Road is only about 9km, Sucat Road was added for a possible loop operation.

4.2 Appraisal framework

This study has applied multi-criteria assessment using both qualitative and quantitative indicators to identify potential BRT corridor(s) for further development. The following criteria have been discussed with and agreed upon by stakeholders:

- Economics
- The environment
- Safety
- Integration (extended to connectivity through consultation process)
- Accessibility
- Deliverability

These six criteria follow an internationally recognized structure for transport scheme appraisal(USAID, 2007; Scutte and Brits, 2012; ITDP, 2007). The strategic nature of this study means that each of the criteria might not be applied with the detail that would be expected from a more in-depth study. Nevertheless, it is asserted that a sufficient understanding of the performance of each corridor against these criteria is achieved that will allow corridor short-listing to take place.

4.2.1 Economic Appraisal

Economic impacts are hinged on the potential number of passengers (or the passenger demand that the BRT could serve) together with the costs of providing such a service. A strategic assessment of this passenger demand along various transport corridors is done to appraise the potential of the BRT to serve the corridor.

Estimates of passenger flows are made for the potential BRT corridors using the weighted average of the product of sectional AADTs and average vehicle occupancies. Volume and occupancy data use both primary and secondary sources (MMDA Traffic flow maps, 2011). The corridors are renamed A to F. The results are shown in Table 2.

Table 2. Estimated Passenger Flows

Corridors		Daily Passenger Flows			
		Private & Public	Public Only	Private Share	Public Share
A	Lerma-SM Fairview via Quezon Ave & Commonwealth	695,433	408,039	41%	59%

B	EDSA-Binangonan - Gilmore via Ortigas Ave	300,174	69,765	77%	23%
C	C5 (SLEX - Commonwealth)	391,313	32,876	92%	8%
D	Bacoor - Dasmarinas via Aguinaldo Highway	105,269	83,152	21%	79%
E	Alabang Zapote Rd and Sucat Rd (23.7 km loop)	106,030	5,903	28%	72%
F	C-3 (Araneta Ave Buendia Ave)	203,347	141,282	31%	69%

Corridor A has the highest estimated passenger flows among all the candidate corridors, followed by Corridor C and Corridor B, all breaching the 300,000 daily passenger flow mark. It is interesting to note that Corridor C or C5 is currently a predominantly private vehicle (and truck) corridor; hence the low public transport passenger volumes. However, a possible diversion of passengers from EDSA to C5 for trips between Quezon City (north of Diliman area) and Makati City can increase the share of public transport passengers by leaps and bounds. Figure 2 demonstrates the potential passenger diversion from EDSA to C5, assuming that the appropriate public transport services (e.g. BRT services) are made available.

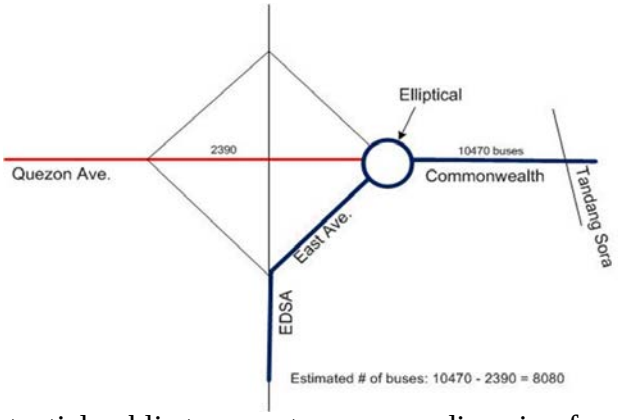

Figure 2. Potential public transport passenger diversion from EDSA to C5

Using bus volume data from the Mega Manila Public Transport Planning Support System study (MMPTPSS, 2011), it has been observed that 10,470 buses ply Commonwealth Ave. Of this number, 2,390 buses go westward along Quezon Ave. and 8,080 buses go southward along EDSA. A portion of the 8,080 buses may divert from EDSA to C5 for passengers with origin-destination north of Tandang Sora in Quezon City and south of Kalayaan Ave. in Makati. This potentially diverted passenger traffic will therefore add to currently estimated passenger flows on C5.

Assuming 50% of this estimated traffic actually gets diverted to C5, there will be approximately 170,000 public transport passengers that will be using the corridor, making C5 an important public transport corridor. With a 50% diversion from EDSA to C5, it is also expected to relieve the current traffic volumes on EDSA, in effect improving the level of service of the corridor, assuming that the other existing vehicle volumes prevail.

Table 3 summarizes the passenger numbers and route lengths defined above. Note that passengers are for all modes and not just public transport passengers. It considers these parameters against an average BRT implementation cost of $7m per km (ITP, 2011) in order to define potential cost and give an indication (approximate only) of potential value for investment.

Table 3. Estimated BRT corridor costs and cost per passenger

BRT Corridor		Passengers	Length, km.	Approx. cost ($M)	Cost ($) per pax
A	Lerma-SM Fairview via Quezon Ave & Commonwealth Ave	695.433	25	175	252
B	EDSA-Binangonan-Gilmore via Ortigas Ave	300,174	24	168	560
C	C-5 (SLEX-Commonwealth Ave)	391,313	26	182	465
D	Bacoor-Dasmarinas via Aguinaldo Hiway	105,269	18	126	1,197
E	Alabang Zapote Rd and Sucat Rd	106,030	23.7	165.9	1,565
F	C-3 (Araneta Ave, Buendia Ave)	203,347	18.5	129.5	637

Within the above table it should be noted that Corridor C has the potential to divert 170,000 trips away from EDSA. If this is the case then total passengers would increase to 541,313 and the cost per passenger would reduce to $336.

4.2.2 Corridor Road Capacity Analysis

Unless right of way acquisition is proposed together with careful planning of the use of existing infrastructure, traffic conditions for private cars may deteriorate for almost all corridors.

Among the corridors being considered, only Commonwealth Ave. corridor and possibly Aguinaldo Highway may experience better traffic conditions when BRT is constructed. This is primarily because of very high public transport volumes at present as well as availability of physical space (in the case of Commonwealth Ave).

Deteriorating private vehicle traffic conditions may encourage private vehicle users to shift to BRT, either voluntarily or with policy intervention. This is a policy decision that must be taken before further analysis and scheme development is undertaken.

4.2.3 Environmental appraisal

Each corridor has been examined in order to highlight any potential significant environmental issues. Beyond that which can either be expected as part of the implementation of a major transport scheme or that which can be managed/mitigated with appropriate design, none were identified. As such, all routes are adjudged, at this stage of analysis, to have roughly equal environmental impact.

4.2.4 Integration/Connectivity

Strong connection between two or more mass transit systems is highly desirable as it would greatly expand the coverage of PT providing high level of service. Moreover, public transport vehicles of lower capacity should be good feeders to BRT. With careful planning of the needed facilities (walkways, conveyors, etc.), transfer can be more convenient to commuters.

Table 4 shows the most likely interconnections among the proposed BRT corridors and rail-based LRT/MRT/PNR lines. The extent of the expected walking distances for transfers is described. BRT stations in close proximity with LRT/MRT and PNR commuter line stations would encourage use of both lines by commuters. Walking distance of about 250m may be considered short and comfortable (Gerilla & Hokao, 1995), beyond that the distance may be considered long.

Table 4. Interconnections among the proposed BRT corridors and rail-based lines

Corridor		Configuration	Remarks
A	Lerma-SM Fairview via Quezon Ave & Commonwealth Ave.	Intersects MRT3 at EDSA`; close to LRT2 at Lerma; intersects PNR commuter line; intersects BRTc	Short walking distance to/from MRT3 station and possibly to /from Lerma LRT2; short walking distance to/from PNR commuter line; common station with BRTc is possible.
B	EDSA-Binangonan – Gilmore via Ortigas Ave	Connects to MRT3; connects to LRT 2 (Intersects BRT c at Ortigas/C-5 intersection)	Long walking distance to/from MRT3; short walking distance to Gilmore Station of LRT2; good transfer to/from BRTc possible
C	C-5 (SLEX-Commonwealth)	Intersects LRT2; intersects BRTa	Short walking distance to/from LRT2 station; common station w BRTa is possible
D	Bacoor-Dasmarinas via Aguinaldo Hiway	Connects to terminus of LRT1 Extension	Good connection(very short walking distance) with LRT1 extension is possible
E	Alabang Zapote Rd and Sucat Rd (23.7km loop)	nearest is LRT Line 1 extension	Short walking distance to/from LRT1 extension is possible
F	C-3 (Araneta Ave, Buendia Ave)	Intersects with PNR commuter line; Connects with BRTa	Short walking distance to PNR station; good connection with BRTa is possible

Overall, good connectivity with existing rail lines and with another possible BRT corridor/s may be expected. However, careful planning and good detailed design of the connections would play key roles in attaining the most desirable outcomes – clean/covered walkways, minimum obstructions along transfer paths, considerate to the physically challenged, etc.

Table 5 shows the interconnectivity matrix of the potential BRT lines w/ existing rail transit lines.

Table 5. Interconnectivity matrix

BRT Corridor	LRT 1	LRT 2	MRT3	PNR commuter	BRT Corridor					
					A	B	C	D	E	F
A. Lerma-SM Fairview		●	●	●			●			
B. EDSA-Binangonan – Gilmore		●	●				●			

C. C-5 (SLEX-Commonwealth)		●			●					
D. Bacoor-Dasmarinas	●									
E. Alabang Zapote Rd and Sucat Rd	●									
F. C-3 (Araneta Ave, Buendia Ave)	●			●	●					

4.2.5 Road Safety

One of the claimed benefits of successful BRT implementations is the reduction of road crashes. Three of the potential BRT corridors exhibit among the highest accident frequencies (Sigua, 2010). It can be observed that accident frequency can be correlated with traffic volumes as shown in Figure 3. Introducing a BRT system on the corridor has the potential for road safety improvement through the reduction in vehicle volume and also through traffic management that is usually an integral part of BRT systems operations.

Arterial	AADT Veh/day	No. of Accidents
EDSA	225,695	6,433
Commonwealth Ave.	190,491	2,628
C-5	156,938	1,745
Quezon Ave.	147,936	1,178
C-3	53,835	534
Marcos Highway	90,693	494

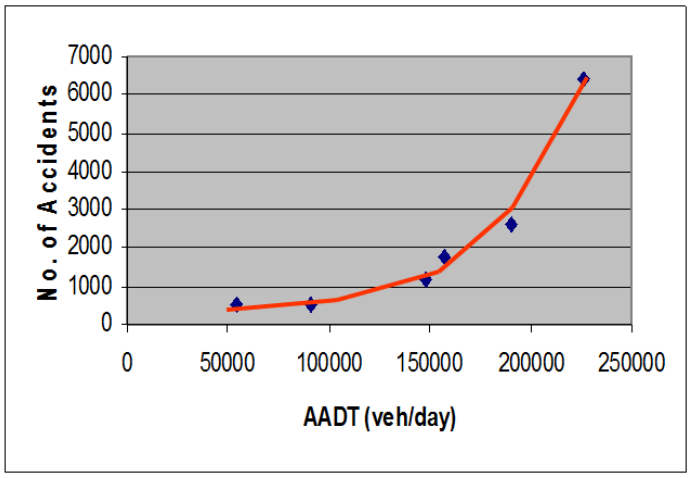

Figure 3. 'Dangerous roads' in Metro Manila (Source of Data: MMDA)

Successful BRT systems in Bogota and Curitiba have not only improved commuter travel times in these cities but also reduced the number of road crashes and contributed to improved air quality. With the Seoul BRT in place, a 27% decrease in road crashes has been noted.

4.2.6 Accessibility

Table 6 shows land use types and key destinations in relation to the potential BRT corridors. It can be seen that the potential BRT corridors pass through intense land use activities especially those within Metro Manila, implying that these key and major destinations can benefit from improved accessibility that is to be provided by a BRT system on these corridors.

Table 6. Land use types and key destinations in relation to the potential BRT corridors

Corridors		Key destinations
A	Lerma-SM Fairview via Quezon Ave & Commonwealth	Universities in Manila and Quezon City, residential areas, commercial areas, shopping malls, leisure areas, worship places, hospitals, government centers, Quezon City CBD, business process outsourcing (BPO) establishments
B	EDSA-Binangonan - Gilmore via Ortigas Ave	Residential areas, commercial areas, Ortigas CBD, government institutions, schools, shopping malls, leisure areas, hospitals
C	C5 (SLEX - Commonwealth)	Fort Bonifacio Global City CBD, residential areas, commercial areas, shopping malls, Eastwood CBD, leisure areas, universities (Ateneo, Miriam, UP)
D	Bacoor - Dasmarinas via Aguinaldo Highway	Residential areas, shopping malls, schools, worship places, golf course, commercial areas, resorts
E	Alabang Zapote Rd and Sucat Rd (23.7 km loop)	Madrigal Business Park, BPO establishments, commercial establishments, hospitals, residential areas, schools, shopping malls, memorial park
F	C-3 (Araneta Ave Buendia Ave)	Residential areas, commercial areas, funeral establishments and support establishments, schools, Makati CBD

4.2.7 Deliverability

One institutional issue that may likely arise is under which jurisdiction a BRT corridor would fall. This would require a more thorough study and models from other countries with successful BRT implementation may be worth investigating.

Metro Manila is composed of 16 cities and 1 municipality. And while issues are generally threshed out among mayors and other members within the Metro Manila Council, it is generally easy to resolve issues concerning just a few local government units.

Table 7 shows the potential BRT corridors with notes on the number of LGUs which would have jurisdiction over each BRT corridor.

Table 7. Number of LGUs under which each BRT corridor would fall

Corridor		Length, km.	LGUs involved
A	Lerma-SM Fairview via Quezon Ave & Commonwealth Ave.	25.0	Quezon City, Manila City (Quezon City only if line terminates at Welcome Rotonda)
B	EDSA-Binangonan – Gilmore via Ortigas Ave	24.0	Pasig City, Quezon City, Rizal Province involving 4 LGUs (Cainta, Taytay, Angono, Binangonan)
C	C-5 (SLEX-Commonwealth)	26.0	Taguig, Pasig, Makati, Quezon City
D	Bacoor-Dasmarinas via Aguinaldo Hiway	18.0	Province of Cavite involving 3 LGUs (Bacoor, Imus, Dasmarinas)
E	Alabang Zapote Rd and Sucat Rd	23.7	Las Pinas City, Paranaque City
F	C-3 (Araneta Ave, Buendia Ave)	18.5	Caloocan City, Navotas, Quezon City, San Juan, Makati, Manila, Pasay

Corridor BRT*a* will run mostly in Quezon City with a total length of 23km. (It has a 2km section within Manila.) Perhaps, it would be the only corridor that may be under only one LGU if the line terminates at Welcome Rotonda.

5. SUMMARY APPRAISAL

Table 8 gives subjective scores to the analysis undertaken in Section 4. The performance against each criterion is marked up to 10 points. Although it is a subjective assessment, it relates to the proportional differences between each corridor studied.

Table 8. Performance scores of corridors against 6 criteria

	Corridor	Economic	Environment	Safety	Integration	Accessibility	Deliverability	TOTAL	Ranking
A	Lerma-SM Fairview via Quezon Ave & Commonwealth Ave.	10	5	9	9	10	8	51	1
B	EDSA-Binangonan – Gilmore via Ortigas Ave	5	5	4	7	7	5	33	3
C	C-5 (SLEX-Commonwealth)	7	5	7	4	7	5	35	2
D	Bacoor-Dasmarinas via Aguinaldo Hiway	2	5	4	1	5	7	24	6
E	Alabang Zapote Rd and Sucat Rd	2	5	4	1	5	8	25	5
F	C-3 (Araneta Ave, Buendia Ave)	4	5	6	5	7	2	29	4

The previous table assumes that the 6 criteria have equal weights. However, one may argue that some criteria should be given more importance than the others when selecting the corridor for implementation. A set of weights is proposed in Table 9.

Table 9. Proposed weights

Criteria	Weight, %
1. Economic	25
2. Environment	10
3. Safety	10
4. Integration	15
5. Accessibility	15
6. Deliverability	25
Total	100

Considering the performance scores given to each corridor for the different criteria, the weighted scores and ranking are determined. There is no change in the standings of the corridors as shown in Table 10.

Table 10. Weighted scores and ranking

	Corridor	Wtd. Score	Ranking
A	Lerma-SM Fairview via Quezon Ave & Commonwealth Ave.	8.75	1
B	EDSA-Binangonan – Gilmore via Ortigas Ave	5.50	3
C	C-5 (SLEX-Commonwealth)	5.85	2
D	Bacoor-Dasmarinas via Aguinaldo Hiway	4.05	6
E	Alabang Zapote Rd and Sucat Rd	4.30	5
F	C-3 (Araneta Ave, Buendia Ave)	4.40	4

6. CONCLUSIONS AND RECOMMENDATIONS

The foregoing analysis demonstrated the application of a simple multi-criteria assessment using both qualitative and quantitative indicators. While the appraisal method may be argued to use a lot of subjective variables, it can prove to be very valuable once they are agreed upon by the key stakeholders. Consensus among them would greatly help in finalizing any decisions and in threshing out any possible challenges that may arise while implementing a particular project.

BRT systems have been proven to be a very good alternative to rail-based mass transit systems in many cities in the world as its capacity can match that of an LRT or MRT, at a fraction of the cost of rail. Metro Manila greatly needs a mass transit system that would provide high quality of service. BRT was highly recommended in the 2007 USAID Study. This is the right time to pursue it in Metro Manila, following and building on the BRT development efforts that have commenced and are on-going in Cebu City.

The summary appraisal presented in Sections 4 and 5 gives the priority listing of the corridors that may be further subjected to more analytical rigor in the next phase of the study. The corridors are again presented here in the recommended order of priority:

1. Lerma-SM Fairview via Quezon Ave & Commonwealth Ave. (Corridor A)
2. C-5 (SLEX-Commonwealth) (Corridor C)
3. EDSA-Binangonan – Gilmore via Ortigas Ave (Corridor B)
4. C-3 (Araneta Ave, Buendia Ave) (Corridor F)
5. Alabang Zapote Rd and Sucat Rd (Corridor E)
6. Bacoor-Dasmarinas via Aguinaldo Hiway (Corridor D)

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