Completion Report

March 2017

Special Capital Budget Project: Improved Daylight Access for the Asian Development Bank Atria and Adjacent Offices

Asian Development Bank

ABBREVIATIONS

ADB	–	Asian Development Bank
OAS	–	Office of Administrative Services

NOTE

In this report,"$" refers to US dollars.

Vice-President	D. Stokes, Administration and Corporate Management
Principal Director	R. Teng, Office of Administrative Services (OAS)
Director	M. Ojiro, Facilities and Asset Management Division, OAS
Team leader	C. Nantham, Lead Facilities Planning and Management Specialist, OAS
Team members	M. Cruel, Facilities Planning and Management Officer (Project Management), OAS M. Habalo, Senior Facilities Planning and Management Officer, OAS M. Lee Oliver, Associate Facilities Planning and Management Officer (Project Management), OAS M. Samson, Facilities Planning and Management Administrator (Budget and Systems), OAS

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I. PROJECT DESCRIPTION

1. In December 2003, the Board approved $1.59 million for the Improved Daylight Access for the Asian Development Bank Atria and Adjacent Offices Project.[1] The project aimed to allow more daylight into the building's interior by (i) expanding the existing skylights to include four new skylight units, (ii) opening the roof on each side of the skylights, and (iii) capping the new openings with glass.[2] Appendix 1 details the approved December 2003 design. However, during implementation, concerns were raised about the safety, security and structural integrity risks posed by the original design. Hence, alternative cost-effective designs were reviewed, and a minor change in project scope[3] was proposed and approved in 2005 (Appendix 2).

2. The revised project design scope retained the original 2003 project objective to allow more daylight into the building; yet, instead of involving major roof demolition and reconstruction, the new design involved the installation of anidolic[4] mirrors to reflect light into the atria through the side clerestory windows,[5] guaranteeing essentially the same lighting effects as those expected under the original design. Appendix 3 details the new 2005 design.

3. The revised 2005 project included the following outputs:

(i) removing and modifying grillage under the clerestory windows and the central skylight;
(ii) reducing the length of the roof overhang outside the clerestory windows;
(iii) installing anidolic mirrors outside the clerestory windows and within the clerestory cavity;
(iv) installing electrical lights to illuminate the underside of the atrium ceiling; and
(v) repainting the ceiling to improve light reflection by the internal surfaces.

4. Upon accomplishing the outputs in para. 4, significant savings of $1.13 million were realized and reallocated for the following works: (i) construction of a cafeteria light well and mezzanine skylight (Appendix 4), and (ii) rehabilitation and repair of the atria roof and cafeteria roof deck (Appendix 5).

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[1] ADB. 2003. *Special Capital Budget Proposal: Improved Daylight Access for the Asian Development Bank Atria and Adjacent Offices.* Manila.

[2] As per Administrative Order 4.04, Appendix 2, para. 27, project completion reports (PCR) will be prepared and submitted by the project management team for each sub-project once it is fully completed and the facility becomes operational. The PCR will include: (i) description of the project; (ii) evaluation of project design and implementation arrangements; (iii) summary of variations including reallocations made and savings realized; (iv) evaluation of performance; (v) overall assessment and lessons learned; and (vi) conclusion and recommendations. The PCR after approval of the Management will be circulated to the Board for information.

[3] ADB Project Administrative Instructions provide that a change in scope or implementation arrangements is classified as 'major' or 'minor'. A 'major' change substantially affects the project's outcome, components, benefits or implementation arrangements. A 'minor' change does not substantially affect the project's outcome, components, benefits or implementation arrangements. The project's supervising unit director decides if a change in scope is 'major' or 'minor'.

[4] This refers to highly reflective surfaces that can be formed into different shapes to reflect and redirect a high percentage of the light falling on them.

[5] These are vertical windows between the underside of the atrium roof and the building roof deck.

II. EVALUATION OF DESIGN AND IMPLEMENTATION

A. Relevance of Design and Formulation

5. The revised 2005 project met the objective of the Asian Development Bank (ADB) to give the occupants along the atria perimeter an increased level of natural light. The works completed with the use of new technology satisfied the occupants by providing more daylight at their respective workplace, resulting in improved productivity. This was confirmed in a post-completion survey conducted in 2007 (Appendix 6).

6. The project was designed and implemented in accordance with the ADB administrative circulars for administrative services.[6] The design employed cost-effective methods and technologies that were nonintrusive and did not require removal and/or alteration of the building's envelope. This solution aligned the project with security measures put into place in the ADB headquarters building.[7]

B. Project Outputs

7. Further to the study undertaken by the consultants, which indicated that natural light level in the atrium ranging from 18 lux to 125 lux, informal feedback from staff working along the interior offices facing the atrium was also gathered. Their feedback indicated that the atria and adjacent offices were insufficiently illuminated even on clear and sunny days. This information was used to benchmark perception of indoor comfort of the occupants, and a study using a nonintrusive approach to enhance daylight in the headquarters atria was subsequently completed to meet the objectives of the outputs as described in para. 4.

8. Based on the outcome of the study, the project was implemented in two stages. The first stage began in September 2005 and included repainting of the atria ceiling, cutting of eaves, and modification of grillage under the skylight and roof clerestory windows. Then, the second stage commenced and was completed in May 2006. It included fabrication and installation of outer mirrors on the roof and inner mirrors within the clerestory cavity. These mirrors act as light scoops, reflecting daylight down into the atria and illuminating the building's interior. When the second stage was finished, the consultant team recorded onsite daylight levels and temperatures.

9. In January 2007, the Office of Administrative Services (OAS) conducted a formal workspace survey of staff to determine the perception of indoor comfort after the second stage was completed. OAS submitted a memorandum on the staff feedback survey results to ADB Management on 21 March 2007 (Appendix 7).

10. The savings realized from the use of nonintrusive approach and reallocated to the works described in para. 5 resulted in increased daylight in the expanded dining area of the cafeteria and extended the life span of atria and cafeteria roof decks. This initiative avoided undertaking

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[6] ADB. 2000. Purchase and Control of Supplies and Equipment-Implementing Procedures. *Administrative Circulars*, AC D-7. Manila; ADB. 2000. Guidelines and Procedures on Procurement Services (including Work Orders, Lease Contracts, Licensing Agreements, and Concessions for Use of Bank's Facilities). *Administrative Circulars*, AC D-12. Manila.

[7] ADB. 2004. *Special Capital Budget Proposal: Rehabilitation of ADB's Headquarters Building and Enhancement of Security.* Manila.

major roof replacement and improved ADB's energy savings by using highly reflective cool roof coating technology.

C. Project Costs

11. The total project cost at completion was $1.56 million. $430,000 was utilized to improve daylight access for ADB atria and adjacent offices As a result of the use of nonintrusive, state of the art technologies in daylighting using anidolic mirrors, savings of $1.13 million were realized. These savings were reallocated to (i) construct cafeteria light well and mezzanine skylight, and (ii) rehabilitate and repair the atria roof and cafeteria roof deck. The breakdown of project costs is provided in Table 1.

Table 1: Financial Report
(as of 30 June 2014)
($)

	Budget			
Cost Category	**Approved Budget**	**Revised Budget**	**Total Disbursements**	**Balance**
Improved daylight access for ADB atria and adjacent offices	1,458,000	438,819	430,385	8,434
Improvement of daylight access to expanded dining space of cafeteria	0	800,000	795,622	4,378
Roof repair works	0	332,225	332,225	0
Contingency	130,800	17,756	0	17,756
Total	**1,588,800**	**1,588,800**	**1,558,233**	**30,568**

Source: Asian Development Bank.

D. Project Implementation Schedule

12. Table 2 provides a breakdown of the project components and the completion dates.

Table 2: Implementation Completion Dates

Component	**Completion Date**
Original Scope	
Access in ADB atria project review in the context of headquarters rehabilitation and security enhancement initiative	May 2004
Final report on daylight study	February 2005
Commencement of retrofit works	September 2005
Retrofit works completion	May 2006
Project close-out report	June 2007
Project Implemented Using Cost Savings	
Construction of cafeteria light well[a] and mezzanine skylight[b]	June 2012
Rehabilitation and repair of atria roof and cafeteria roof deck[c]	December 2013

[a] An existing open light well in the cafeteria was converted into a dining area for additional seating. To allow daylight to reach the offices below this section of the cafeteria, glass blocks were used for flooring and a glass pyramid was added.

[b] A skylight was constructed above the cafeteria food court to increase daylight illumination to this area as well as to the cafeteria's mezzanine level.

[c] Rehabilitation and repair involved the application of a protective roof maintenance coating system that restored the integrity of the roof and provided waterproofing and weatherproofing protection. The coating system made use of highly-reflective cool roof coating products certified by Energy Star, a United States Environmental Protection Agency voluntary program, and is expected to increase ADB's energy savings.

Source: Asian Development Bank.

E. Implementation Arrangements

13. The project was implemented by ADB's Asset and Project Management Unit under the direct supervision of the Director, Facilities and Asset Management Division of OAS.

F. Consultant Recruitment and Procurement

14. The individual staff consultant was recruited in accordance with ADB's Guidelines on the Use of Consultants.[8] Procurement of goods and services for the project was split into two parts: (i) one for the design, installation, and supply of the anidolic mirrors (daylight scoop) on the roof deck along the perimeter of the atrium clerestory windows; and (ii) the other for the repair and refurbishing of the false ceiling directly below the atria roof.

15. Procurement for the first part of the project was carried out through a two-stage bidding procedure. In this procedure, at the first stage, technical proposals indicating different options (design concept and construction methodology) meeting the minimum operating and performance requirements but without prices are discussed between the bidder concerned and ADB in order to agree on acceptable technical standard for all bids. Once the standard is determined, the bidders are given the opportunity to revise their respective technical proposals to conform to the agreed standard based on which, price proposals are submitted. The lowest substantially complying bidder is selected. The contractor for the second part was selected through single-stage, two-envelope bidding.

G. Performance of Consultants, Contractors, and Suppliers

16. The intention of the consultant's design, which is daylight harvesting by scooping daylight into the interior atria light well through nonintrusive technology using anidolic mirrors, accomplished the outputs. It was safer to implement and the enhanced daylight effect in the interior offices along the atria resulted in significant cost savings. Therefore, the consultant has performed his function effectively.

17. Two contractors were engaged to undertake the project. One installed the anidolic mirrors and interior aluminum reflecting surface and removed the grillage. The other repaired and refurbished the interior ceiling below the atria roof. Both fulfilled their contractual responsibilities and were well-organized. The works were completed within the approved budget and in accordance with the design, contract requirements, and technical specifications. No significant delays, accidents, or incidents occurred during implementation.

18. The contractors and consultants involved in increasing daylight in the expanded dining area of the cafeteria and undertaking roof repairs of the atria and cafeteria roof decks performed their respective functions effectively.

H. Performance of Office of Administrative Services in Implementing the Project

19. OAS has performed *satisfactorily* in achieving the goals and objectives of this project. The project increased daylight into the atria light well and improved the comfort of occupants in the offices along the atria perimeter, increased the daylight in the expanded cafeteria dining

[8] ADB. 2002. *Guidelines on the Use of Consultants by ADB and its Borrowers*. Manila.

area, and extended the life span of the atria and cafeteria roof decks. It was completed within the budget and timeline.

III. EVALUATION OF PERFORMANCE

A. Relevance

20. The shortage of natural light in the ADB atria had adversely affected staff working in offices along the atria perimeter by influencing their comfort level and productivity. It also created a gap in the way that office space was viewed by staff in general—offices adjacent to external windows were perceived as far more desirable than those overlooking the atria because of its insufficient natural light. Thus, it created a higher demand for office space along the building's perimeter, which could not be met due to space constraints.

21. The project design increased the daylight into the atria light well (Appendix 8) and improved the comfort of occupants working in the offices along the atria perimeter. Other positive results include a more conducive working environment, and it transformed the library into a useful place or hub for knowledge sharing to promote ADB programs and initiatives, and also provided workspace for consultants. Therefore, the project is rated *relevant*.

B. Effectiveness in Achieving Outcome

22. The revised 2005 project completed its outputs and was implemented within budget and enabled savings, which was used to increase the daylight in the expanded cafeteria dining area, and extended the life span of the atria and cafeteria roof decks. The project's outcomes—increasing comfort of staff working along the atria perimeter offices, turning the library into a useful place for knowledge sharing, and creating a convenient cafeteria dining space for staff, consultants, service providers and external participants of business functions—were achieved. The project is rated *effective.*

C. Efficiency in Achieving Outcome and Outputs

23. Significant savings were realized by ADB's adoption of the state of the art, nonintrusive option. The project design is energy efficient because of the use of anidolic mirrors, which scoop in significant daylight into the atria without increasing air temperature. This reduced the energy load on the building's air-conditioning system, and the use of artificial lighting during daylight hours. Consequently, the operational costs declined resulting in average annual savings of $44,500 in 10 hours of operations per day. The project is rated *efficient.*

D. Preliminary Assessment of Sustainability

24. The project is rated *sustainable*. The anidolic mirrors scooping daylight into the atria light well require basic maintenance services like cleaning. As long as there is daylight, it will be continuously reflected into the atria. Moreover, the protective coating applied on the skylight, and the highly reflective cool roof coating technology of the repaired atria and cafeteria roof decks have extended the life span of the skylight and roofs.

E. Impact

25. The project had a significant positive social impact on headquarters occupants. In a post-completion survey, a majority of the survey respondents said the daylight enhancement project had a positive effect on the work environment. 68% said that being assigned an office that faces an atrium had become more acceptable. The survey results indicated that thermal comfort remained unchanged. 89% found the visual comfort acceptable.

26. The added daylight brought in by the project improvements has increased use of the headquarters library. Previously, only about 20-30 people per day would use a section that was dim and gloomy. The added natural light has brightened and enlivened the library space, which now has a café frequented by staff and a venue for seminars and presentations. Today, more than 100 people use the library per day for meetings and research. The daylight in the atria is greater than 600 lux on a clear and sunny day.

27. The positive impact of this daylight enhancement project was considered in the design of the cafeteria rehabilitation and expansion. Additional skylights were introduced at the mezzanine and deli area of the expanded cafeteria. Similarly, this daylight enhancement was also considered in the third atrium particularly for skylights at the roof deck and light wells in interior offices.

28. The increased daylight in the atria has lowered the consumption of electrical energy; thus, reducing the carbon footprint, which has a positive environmental impact. The protective glass coating eliminates the need for harsh chemical cleaning agent and helps prevent the build-up of mold and harmful bacteria.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

29. The project was implemented as planned, and all project outputs were delivered as envisaged. The project has (i) increased the natural daylight in the atria and adjacent staff offices, (ii) saved on labor and construction costs, and (iii) lowered energy consumption in the building. It is rated *successful*.

B. Recommendations

30. This is one of the largest daylight harvesting projects undertaken in Asia. Hence, the project should serve as a model for institutions looking for a benchmark for this kind of building technology and design features.

SPECIAL CAPITAL BUDGET PROPOSAL
IMPROVED DAYLIGHT ACCESS FOR THE ASIAN DEVELOPMENT BANK ATRIA AND ADJACENT OFFICES

BOARD OF DIRECTORS

ASIAN DEVELOPMENT BANK

FOR OFFICIAL USE ONLY

R262-03
26 November 2003

SPECIAL CAPITAL BUDGET PROPOSAL
IMPROVED DAYLIGHT ACCESS
FOR THE ASIAN DEVELOPMENT BANK ATRIA
AND ADJACENT OFFICES

1. Attached for the consideration of the Board is a paper on the above subject.

2. In the absence of any request for discussion (which should be communicated to The Secretary by the close of business on 17 December 2003), the recommendation in paragraph 21 of the Paper will be deemed to have been approved, to be so recorded in the minutes of a subsequent meeting of the Board. Any notified abstentions or objections will also be recorded in the minutes.

For Inquiries: A. Shah, Office of Administrative Services
(Ext. 4215)
F. Kapadia, Office of Administrative Services
(Ext. 4878)
C. Nantham, Office of Administrative Services
(Ext. 4233)

ASIAN DEVELOPMENT BANK

SPECIAL CAPITAL BUDGET PROPOSAL

IMPROVED DAYLIGHT ACCESS FOR THE ASIAN DEVELOPMENT BANK ATRIA AND ADJACENT STAFF OFFICES

November 2003

CURRENCY EQUIVALENTS
(as of 12 November 2003)

Currency Unit	–	Philippine Peso (PHP)
PHP1.00	=	$0.0181
$1.00	=	PHP 55.1600

ABBREVIATIONS

ADB	–	Asian Development Bank
OAS	–	Office of Administrative Services

NOTE

In this report, "$" refers to US dollars.

I. INTRODUCTION

1. The Asian Development Bank (ADB) headquarters building was designed in the 1980s with specific environmental objectives, one of which was daylight access for its occupants. Daylight penetration into the heart of the building is achieved via two atria, each measuring approximately 30 by 30 meters. A pyramidal roof above each atrium admits light in two ways: a central skylight measuring 10.8 by 10.8 meters, and perimeter clerestory windows, 1.4 meters high, along the base of the pyramid. Beneath each roof opening—skylight and clerestory—a timber grill diffuses incoming light.

2. Each atrium is 9 stories high, measuring 37 meters from floor to roof. The first floor is the ADB library; the last floor is level 9, which has a circulation corridor along the atrium perimeter. The remaining 7 floors, levels 2 to 8, consist of office spaces. Of the total partitioned office spaces on these floors, about a third overlook the atrium.

3. In the decades since the building was commissioned, building design and technology have progressed on several fronts, as has ADB's appreciation of how daylight affects the workplace in terms of occupant satisfaction and productivity.

4. A study was commissioned by the Office of Administrative Services (OAS) in February 2003 to look into the problem of insufficient natural light in the ADB atria. This condition adversely affects staff working in offices next to an atrium, influencing their comfort level and productivity. The shortage of natural light also creates a gap in the way that office space in ADB is viewed by staff in general, offices adjacent to external windows being perceived as far more desirable than those overlooking the atria. This creates a higher demand for office space along the building's perimeter, one that cannot be met due to space constraints.

II. BACKGROUND AND JUSTIFICATION

5. The OAS study set out to establish, first, whether daylight reaching the atria floor and adjacent offices is insufficient. Onsite readings taken by the consultant showed that daylight availability in the atria and adjacent offices is well below that available in other buildings in Manila. International illuminance standards also suggest that the ADB building should do much better. Based on these standards, offices should be designed for light levels of between 300 and 750 lux,[1] while public spaces (such as atria) under Manila skies should be between 750 and 1,000 lux.[2] In an ADB office, halfway up the west atrium, the natural light level at noon on a sunny day in March was only 18 lux. Readings taken at the West atrium library showed that natural light peaked at 125 lux. Thus, the atria and adjacent offices are insufficiently illuminated, even on clear and sunny days. Conditions are much gloomier on overcast days.

6. High performance glass products that are now available, such as low-emissivity[3] panels, permit greater openness for building interiors without resulting in excessive heat load.

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[1] Lux is a unit of illuminance, i.e., the amount of light reaching a plane. The Commission Internationale de l'Eclaire and the Illuminating Engineering Society of North America recommend light levels between 300 and 750 lux. This recommendation, however, is specific to task illumination, i.e., the amount of light needed to carry out typical office activities.

[2] The Chartered Institute of Building Engineers guidelines for public spaces, such as atria, suggest that a daylight factor of 5% is sufficient to create the appearance of a bright and daylight space.

[3] Low-emissivity coatings may be applied to glass used in double-pane assemblies to control thermal radiation. These filter out the heat producing portions of the solar spectrum, but still allow the greatest possible visible light transmittance. Windows with spectrally selective glazing allow more natural light into homes or other buildings,

Mechanized features such as retractable screens and adjustable louvers, which allow a building to automatically respond to changing climatic conditions, have become increasingly reliable. Computer simulation tools allow designers to visualize and predict daylight entry with a high degree of certainty[4].

7. Equally noteworthy is that expectations of the workplace occupants have changed. Daylight in the workplace of the 21st century is deemed a necessity. Many ADB staff are from developed countries where laws govern workplace access to natural light. These laws are based on concerns for health and safety[5] and on the need to harness greater productivity at the workplace.[6] By these standards, the current design of the ADB headquarters atria is inadequate.

III. THE PROJECT

A. Scope of Building Alterations

8. The proposal to improve the daylight access into the atria seeks to address occupants' needs, using current technology and building products. The following alterations will involve changes to the roof and ceiling, without any change to the primary building structure:

(i) The existing skylight area will be expanded to include four new skylight units. This expansion involves opening the roof on each side of the skylight and capping the new openings with glass that will admit substantial daylight.

(ii) The ceiling directly below the new skylights will be replaced with a frosted glass panel that will serve as a diffuser to filter light into the atrium space.

(iii) A retractable sunscreen mounted on a lightweight steel frame will be installed beneath the central skylight to deal with periods of direct sunlight.

9. Computer simulations suggest that these alterations will significantly alter the amount of natural light reaching the atrium floor, with the new roof capable of delivering at least 750 lux under clear sky conditions (as per the standards described in para. 5). Simulations also suggest that light levels in office spaces overlooking the atria will rise significantly.[7] These increases will enhance the working environment with a corresponding improvement in occupant comfort (para. 21).

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while controlling radiated heat, providing maximum energy efficiency and reducing heat loads in areas where cooling costs are high.

[4] This varies with tools and simulations. In the ADB study, for instance, two tools are deployed. ECOTECT is used for tracking sun path, sunlight penetration and shadow casting. This is accurate to any building geometry and geographical location. LIGHTSCAPE is used for estimating indoor illuminance. This is accurate to different sky conditions found across the globe, and is deemed one of the leading visualization tools for daylight design.

[5] A 1989 European Union (EU) directive requires that with regard to "Natural and artificial room lighting, workplaces must as far as possible receive sufficient natural light and be equipped with artificial lighting adequate for the protection of workers' safety and health." This requirement is binding for all EU member states.

[6] In *Peopleware: Productive Projects and Teams* (1999, New York, Dorset House Publishing) the authors Tom DeMarco and Timothy Lister examined technological or organizational problems that cause low productivity and found that "For most companies with productivity problems, the most promising field of activity is office environment ... Under daylight the performance is higher. People feel better under daylight, this improves their working abilities."

[7] This varies across the height of the atrium and depth into the room, as such cannot be quantified with a single figure. Within the Level 2 offices, the lowest office floor overlooking the atrium, illuminance levels estimated by the software LIGHTSCAPE suggest that on a clear day in March, daylight next to the window amounts to an 8-10 fold increase over existing levels.

B. Consulting Services

10. Consulting services will be used to assist in (i) preparation of the relevant bid documents, (ii) evaluation of bids, (iii) project management, (iv) documentation and maintenance training, and (v) quality control and acceptance of skylight installation. The consultant(s) will be recruited in accordance with ADB's guidelines on the use of consultants[8], and other arrangements satisfactory to ADB for the engagement of domestic consultants.

C. Cost Estimates

11. The proposed alterations are estimated at $1.588 million. The cost estimates are in Appendix 1.

D. Depreciation

12. Upon completion and commissioning of the project facilities, the capital expenditure will be depreciated in accordance with Administrative Order No. 4.04 on Capital Expenditures Policies and Procedures[9].

E. Procurement Arrangements

13. Goods and services will be procured in accordance with the following administrative circulars for administrative services:

(i) D-7: "Purchase and Control of Supplies and Equipment–Implementing Procedures"[10]; and
(ii) D-12: "Guidelines and Procedures on Procurement of Services (Including Work Orders, Lease Contracts, Licensing Agreements, and Concessions for Use of Bank's Facilities)"[11].

F. Implementation Schedule

14. Project implementation is expected to commence in November 2003 with invitation for bids being sent out for the engineering consultant, and the alterations are expected to be completed within 18 months, i.e., in April 2005. The implementation schedule is set out in Appendix 2.

IV. IMPLEMENTATION OF THE PROJECT

A. Management of the Project

15. OAS will be responsible for starting and implementing the project including interdepartmental coordination, budgetary control, reporting arrangements, and obtaining of Management guidance and approval as needed.

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[8] ADB. 2002. *Guidelines on the Use of Consultants by ADB and its Borrowers*. Manila.
[9] ADB. 1993. Capital Expenditures Policies and Procedures. *Administrative Orders*, 4.04. Lotus Notes database. LNADBG1.
[10] ADB. 2000. Purchase and Control of Supplies and Equipment-Implementing Procedures. *Administrative Circulars*, D-7. Lotus Notes database. LNADBG1.
[11] ADB. 2000. Guidelines and Procedures on Procurement Services (including Work Orders, Lease Contracts, Licensing Agreements, and Concessions for Use of Bank's Facilities). *Administrative Circulars*, D-12. Lotus Notes database. LNADBG1.

16. Consultant(s) will be engaged to assist with project management from initiation to closure within following estimated periods:

(i) 12 weeks to invite and evaluate bids for an engineering consultant with relevant experience;

(ii) 18 weeks to produce bid documents, including detailed work plans, engineering drawings, work schedules, and specifications of materials to be used in the new skylights (the documents will include specifications for any mechanical systems and interior design elements, and all needed forms and documentation);

(iii) 12 weeks to invite and evaluate bids for a specialist contractor with relevant experience;

(iv) 14 weeks for offsite works, including the manufacture of all prefabricated components and performance testing of skylight systems; and

(v) 20 weeks for all onsite installations.

17. The consultant(s) and specialist contractor will be under the direct supervision of the OAS.

18. Where possible, a substantial part of onsite work, in particular noise-generating activities, will take place outside regular working hours to minimize disruption to building occupants.

B. Operation and Maintenance

19. After alterations, the atria roof will continue to be maintained by ADB's in-house service provider. In the new roof system, three types of surfaces will need maintenance access, each with a different frequency of cleaning due to varying exposure to dirt.

20. The outer face of the skylights, in contact with weather and pollution, will need cleaning approximately once every 4 months. The cleaning will involve washing with water and detergent, accessed from the concrete roof slab. This is likely to involve no more than 3 person-days per cleaning per atrium, for a total of 18 person-days/year. Safety cables and footholds will be designed into the system to allow manual rope access.

21. The inner surfaces of the two glass panels, between the clear skylight glass and frosted inner glass, are less exposed to dirt than the outer face, and therefore need less frequent cleaning. This can occur once annually. Access will be through trap doors built into the new roof, accessed from the concrete roof, and movement will take place along catwalks that will be built into the cavity. This should require no more than 2 person-days per cleaning per atrium, for a total of 4 person-days/year.

22. The inner face of the frosted glass is the visible ceiling surface seen from inside the atria. This is the least exposed surface to external pollutants as it is in perpetual contact with airconditioned interior. This will need cleaning once annually. Access will be by rope and chairs attached to motorized lifting eyes and hooks hidden at the underside of the skylight. This will need no more than 2 person-days per cleaning per atrium, for a total of 4 person-days/year.

23. The total required for the atria maintenance is about 26 person-days per year. The service provider will receive appropriate instructions to carry out the task.

V. BENEFITS AND RISKS

A. Benefits

24. The proposed project will substantially improve the level of natural light found within ADB headquarters and result in the following:

(i) **Greater visual comfort for occupants in offices overlooking the atria.** This group accounts for approximately one third of all staff on a typical floor. Building designers and environmental psychologists generally acknowledge that daylight is a fundamental human need. While electric light can fulfill functional requirements, such as sufficient illumination for workplace activities, it does not address psychological needs-in particular, a connection with the outdoors. Opening up the atria to daylight will improve this environment condition. The result is likely to be greater occupant satisfaction and/or workplace productivity.

(ii) **Higher value attached by ADB staff to offices overlooking the atria.** At present, these offices overlooking the atria are deemed less desirable than offices with external windows. While the latter cannot be fully matched in terms of view, the gap between the two office types must be reduced at least in terms of availability of natural light. Altering the roof to let in more light will improve the perceived value of office spaces around the atria. This is critical to ADB, where there is a shortage of available office space.

(iii) **Better aesthetics.** The roof will be opened to the sky, which will redefine the aesthetics of its interior. Currently, due to the low levels of natural light in the atria result in a gloomy ambience that is neither appropriate nor desirable. With increased daylight, this will change for the better, creating an appearance that is more pleasing.

B. Risks

20. The study has addressed several implications arising from the proposed alterations to the atrium roof

(i) **Wet weather.** Onsite works will be carried out during the dry season (November to March). To deal with incidental rain during this period, all roof openings will be covered with a waterproof canopy.

(ii) **Noise disturbance.** To minimize the noise, for instance when cutting and removing reinforced concrete slabs in the roof:

(a) work will be done outside office hours e.g., on weekends and at night;
(b) a sound dampening layer will be added to the working platform to reduce sound transmission to the inner atria space;

(c) sound insulated booths on the roof for cutting and trimming new construction materials will be installed; and
(d) preassembly and fabrication work will be done on the ground (if space is available) rather than on the roof.

(iii) **Operational costs.** As a result of the increase in skylight area, the roof will admit more heat. The airconditioning system can handle the additional energy load of 1,188 kilowatt-hours/day.[12] The new skylights are similar to the existing skylight. The inner face of the glass will not require frequent cleaning because of its contact with indoor air, and the outer face can be easily reached from the surrounding roof surfaces. Maintenance costs will not be significant. Existing housekeeping staff can clean the new skylights.

VI. THE PRESIDENT'S RECOMMENDATION

21. The President recommends that the Board approve the capital expenditure of $1.6 million for the Special Budget Proposal: Improved Daylight Access for ADB Atria and Adjacent Staff Offices.

[12] At current utility rates of P6/kilowatt-hour, this will amount to around $130 (P7,000) a day.

Cost Estimates

($'000)

Item	Quantity (m^2)	Total Cost
1. New Skylight Fixed to Existing Roof Structure	400	180.0
2. New Horizontal Glazing to Underside of Roof	400	170.0
3. Performance Testing of Skylight System	–	30.0
4. Remodeling of the Ceiling	400	26.0
5. Demolition	–	35.0
6. Temporary Working Platform and Roof Frame	900	38.0
7. Mechanical and Electrical Works (including retractable sunscreens[a])	–	90.0
8. Contractor's Preliminaries[b] (15% of items 1–7)	–	85.0
Cost of Each Atrium		**654.0**
Cost of Two Atria		**1,308.0**
9. Contingency (10% of cost of works above)		130.8
10. Consultancy fees		150.0
Total		**1,588.8**

m^2= square meter Source: Asian Development Bank estimates.

[a] Retractable sunscreens are electro-mechanical systems, hence they are included in the mechanical and electrical works.

[b] "Preliminaries" refers to costs associated with project initiation and upkeep, such as the setting up of a site office, temporary works like hoardings, safety measures associated with the rehabilitation of an existing building, waste disposal, temporary power, and insurance.

Indicative Project Schedule

	2003		2004												2005			
Activity	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**
I Bids for Engineering Consultant Services																		
II Design Development and Preparation of Construction Details																		
III Bids for Specialist Contractor																		
IV Offsite Prefabrication Work and Testing																		
V Onsite Installation																		

MEMORANDUM ON THE CHANGE OF OPTION FOR IMPLEMENTATION

ADB
Asian Development Bank

ASIAN DEVELOPMENT BANK
RECEIVED
28 FEB 2005
VICE PRESIDENT'S OFFICE
(FINANCE & ADMIN.)

Memorandum
Office of Administrative Services

25 February 2005
OAFA-FM:SM/05:017

For approval of Para 5

ASIAN DEVELOPMENT BANK
RECEIVED
- 8 MAR 2005
OFFICE OF THE PRESIDENT

To: President H. Kuroda 2/3

Through: Vice President (F&A)

From: Principal Director, OAS

Subject: **Improved Atria Daylight Access – Change of Option for Implementation**

1. In December 2003, the Board approved $1.588 million to improve daylight access to the ADB atria. Subsequently, the atria project was reviewed in the context of the Headquarters rehabilitation and security enhancement initiative, approved in May 2004. The review concluded that the planned intrusive method of replacing sections of the roof with glass panels poses a security risk to the Headquarters building. Accordingly, alternative options were sought.

2. Keeping the objective to enhance daylight access to the atria unchanged, alternatives of non-intrusive and yet optimal and cost-effective methods which are compliant with the security standards were assessed. A study carried out by a consultant has shown that by using the latest state of the art technologies in day lighting, a non-intrusive method which does not require the demolition of the composite structural roof, is expected to be close to the day lighting effect projected in the initial approach. The non-intrusive method proposed makes use of 'anadolic mirrors'[1] to reflect light into the atria area through the side celestory windows[2].

3. The proposed option is non-intrusive as it does not require the demolition of the composite structural roof. Using the new technology would however require that the weather beaten atria roof undergo significant repair. Since the originally planned intrusive method intended to replace large parts of the atria roof with new skylights, no repair costs were necessary and hence not part of the overall cost estimate. The cost of the necessary repair of the atria roof will form part of the new option chosen.

4. It is expected that through the proposed option, including the repair of the atria roof, overall savings may be realized. It is therefore suggested that any savings available will be used to pilot test further light enhancements to the inner offices of the central portion of the Headquarters building. Such light enhancements are consistent with the overall objective of the approved special capital expenditure paper.

5. We therefore seek the President's approval to implement this new non intrusive option.

[1] Highly reflective surface that can be formed into different shapes to reflect and redirect a high percentage of light falling on it.
[2] Side windows at the Atria roof.

RECEIVED
28 MAR 2005

NEW 2005 DESIGN

Figure A3.1: Nonintrusive Solution

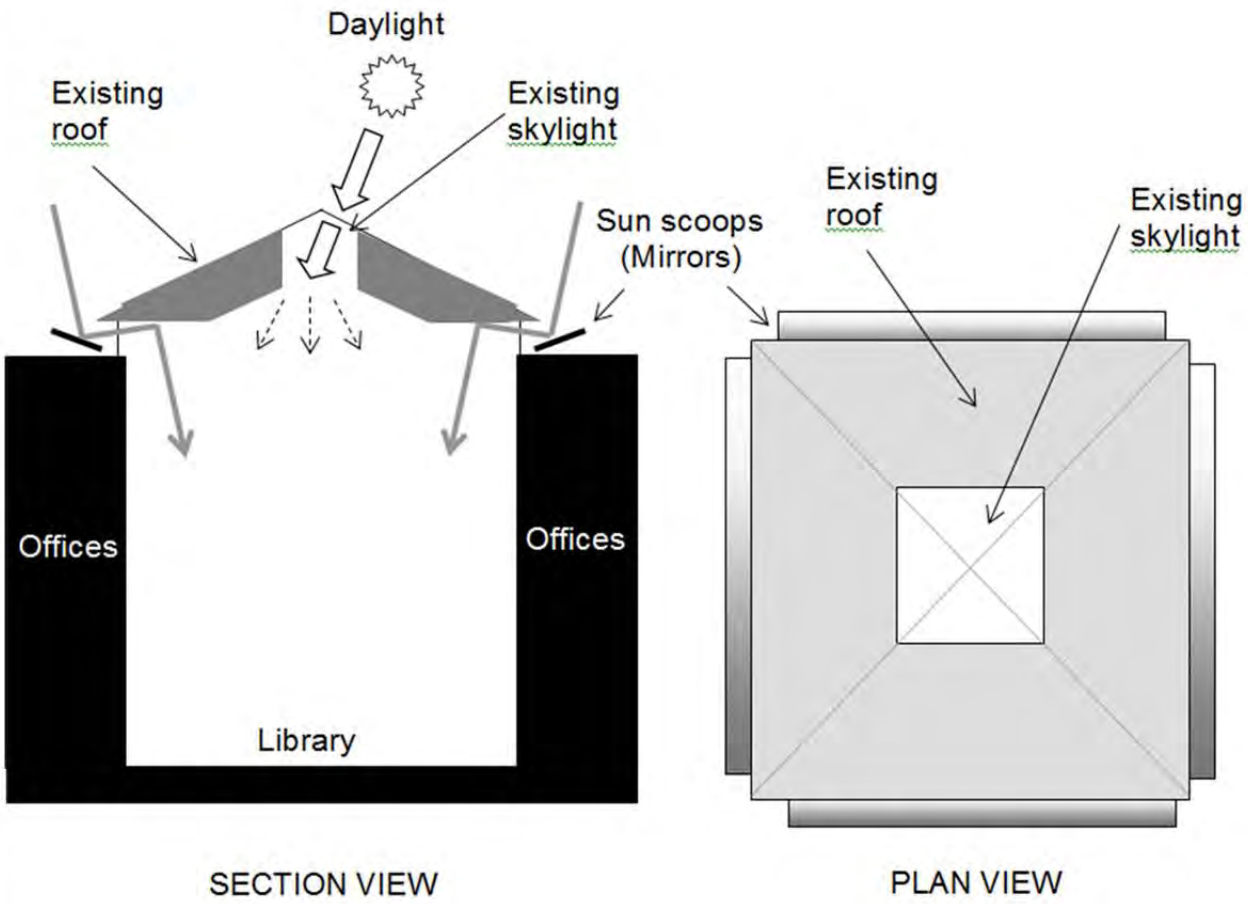
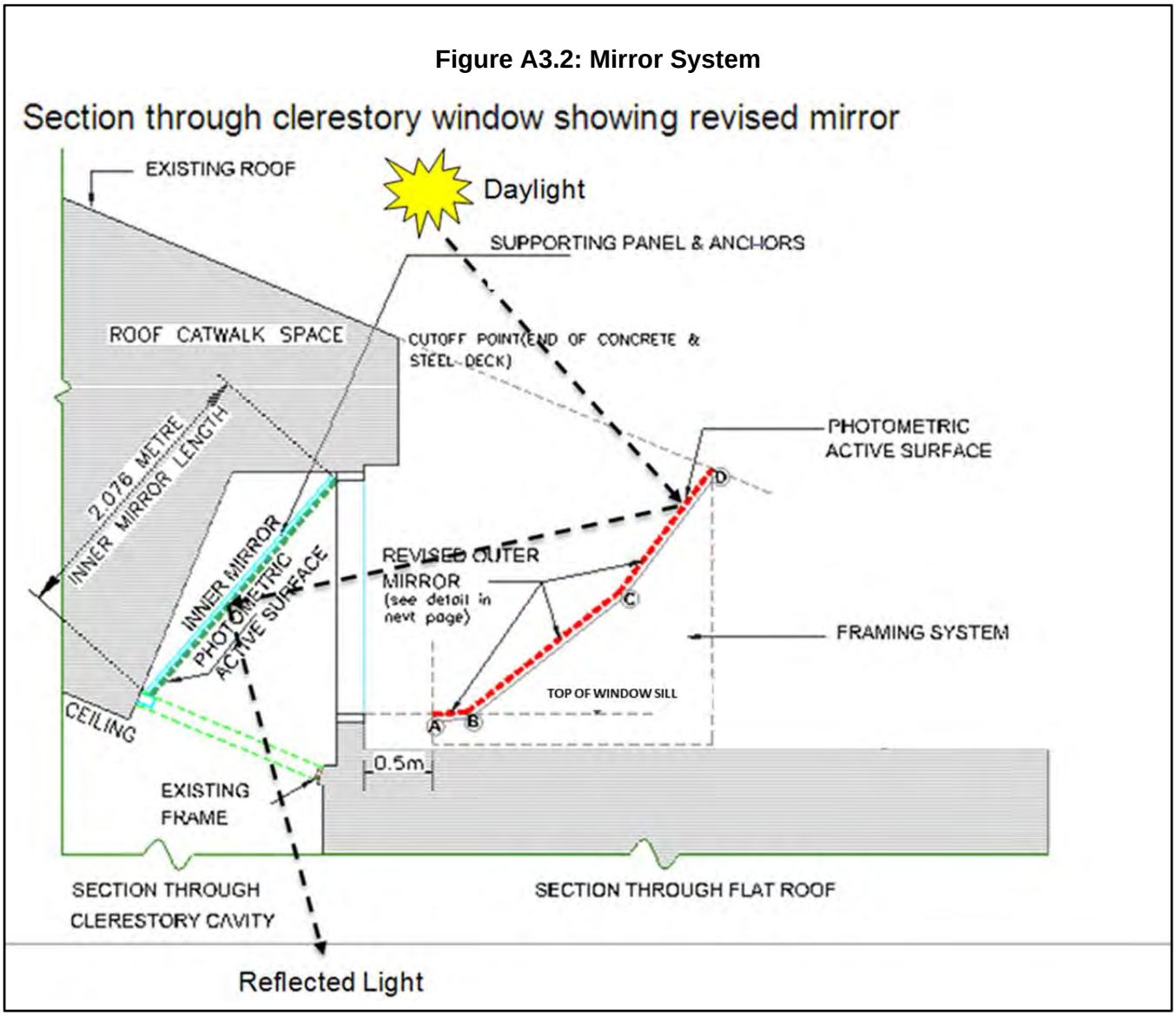


Figure A3.2: Mirror System



MEMORANDUM ON THE REQUEST FOR BUDGET REALLOCATION FOR THE CONSTRUCTION OF CAFETERIA LIGHT WELL AND MEZZANINE SKYLIGHT

ADB Asian Development Bank

ASIAN DEVELOPMENT BANK RECEIVED 10 JUL 2009 OFFICE OF THE PRINCIPAL DIRECTOR Office of Administrative Services

ASIAN DEVELOPMENT BANK RECEIVED JUL 06 2009 DIRECTOR GENERAL BUDGET, PERSONNEL AND MANAGEMENT SYSTEMS DEPARTMENT

ASIAN DEVELOPMENT BANK RECEIVED 06 JUL 2009 BUDGET & MGT. SERVICES D

Memorandum

Office of Administrative Services
Office of the Principal Director

06 July 2009

To: Masayuki Tamagawa, Director General, BPMSD

From: C.R. Rajendran, Principal Director, OAS

Subject: **Proposed Improvement of Daylight Access into the Expanded Portion of the Dining Space of the Cafeteria — Request for Budgetary Reallocation**

A. Matter for Consideration

1. In accordance with the Implementation Guidelines and Financial Controls for the Special Capital Budget Projects, your approval is sought to reallocate and utilize the amount of US$850,000 from the remaining available budget of US$1,149,981 under the Improved Daylight Access for the ADB Atria and Adjacent Offices (R262-03) Project. The budget breakdown is shown in the table below:

Table1. Improved Daylight Access for the ADB Atria and Adjacent Offices – Budget Utilization Status
(In US$)

Cost Category	Budget		Utilization			
	Approved Budget A1	Revised Budget A2	Total Commitments B	Total Disbursements C	Undisbursed Commitments D=B-C	Uncommitted Budget E=A-B
1. Project's Estimated Cost	1,458,000		438,819	430,385	8,434	1,019,181
2. Contingency	130,800		0	0	0	130,800
Total	1,588,800		438,819	430,385	8,434	1,149,981

2. The requested funds will be used to increase the amount of daylight and also expand the seating capacity in the cafeteria by redesigning the existing veranda area. The design of the skylight will be similar to the existing one located at the cafeteria hallway entrance adjacent to the courtyard (Appendix 1) to achieve symmetry. The improved daylight access is expected to reduce artificial indoor lighting. The proposal is intended to create a conducive dining atmosphere that connects with the external environment. The newly designed food court in the expanded veranda area and the additional dining areas will sustain the architectural character of the cafeteria while making it more attractive to staff and visitors and maintaining a pleasant dining ambience.

3. This budget reallocation will also create an additional dining space by recovering the void of the skylight area that is situated above the former printing section (Room G938) at the ground floor (Appendix 2).

B. Background

4. The Asian Development Bank (ADB) Headquarters building was designed in the 1980s with specific environmental objectives that include daylight access for its occupants. Since then, building design and technology have progressed along with ADB's appreciation of how daylight affects the general workplace in terms of occupant productivity and satisfaction. Thus, the planning of rehabilitation projects at the ADB Headquarters considers opportunities to increase the availability of natural light at various parts of the building including public spaces like the cafeteria.

5. The ongoing Cafeteria and Kitchen Rehabilitation Project was designed to upgrade the existing kitchen facilities and provide staff with more food choices through adoption of the food court concept. During the presentation of the above project to Vice President of Finance and Administration (VPFA) on 08 April 2009, he noted that, in light of Strategy 2020 and the newly approved GCI it was important to ensure the creation of additional dining space at the reclaimed veranda area. Further, he also suggested design modification to ensure the introduction of more daylight at the expanded portion of the dining space at the veranda area.

6. In order to comply with Management's comments, the architectural and engineering design was reviewed and a revised design has been developed which will accommodate the important factors mentioned above. It has also been ensured that:

(i) there will be minimal disruption to the Food Services operation and suitable integration with the ongoing cafeteria rehabilitation project at site; and
(ii) the proposed design will blend with designs being considered for the future ADB Headquarters building expansion.

C. Proposal and Benefit

7. The present proposal which takes into account the above concerns has the following features:

a. to increase volume of daylight access to the expanded veranda area, a skylight similar to the one at the cafeteria entrance adjacent to the courtyard will be provided;
b. to expand the dining space capacity by 148 seats a mezzanine floor will be built above the new food court located at the veranda with a passageway connecting the Executive Dining Room (EDR); and
c. additional dining space to accommodate 48 more seats will also be created by accessing the skylight area that is above the old printing section at the ground floor from cafeteria hallway.

8. The benefits arising from the proposed plan are:

a. improved daylight access into the expanded veranda area of the cafeteria, and reduced use of artificial lighting;
b. an additional seating capacity of 196 seats which translates to a 48% increase in the cafeteria's seating capacity; and
c. easy access to the EDR to provide space for large events

9. The newly developed design proposal has been presented to BPMSD, Staff Council officers and the VPFA, who have generally approved the proposed design and cleared the project for implementation. The Staff Council officers in particular have requested that staff be kept informed on the progress of this project on a regular basis. OAS will ensure this.

10. The new design will ensure both internal and external integration with the existing architecture and also not change any of the design features of the already ongoing Cafeteria and Kitchen Rehabilitation Project. The cost estimates include the requirement of furniture and furnishings for the significantly expanded seating capacity. It will be ensured that these blend with the existing furniture and decor in the cafeteria. No provision for furniture was made in the ongoing project.

D. Recommendation

11. The proposed budget breakdown for the proposed option stated in the preceding paragraphs is:

Table 2. Proposed Budget Breakdown
(In US$)

Cost Category	Proposed Budget
A. Building	
1. Civil works	230,000
2. Building Services	160,000
3. Fittings & Finishings	180,000
4. Equipment	100,000
B. Furniture & Furnishings	90,000
C. Consulting Services	90,000
Total	**850,000**

12. We recommend the implementation of the proposed option to achieve an increased volume of daylight, as well as integrated dining facilities that continue to maintain the existing architectural character of the building. This will provide a conducive dining ambience that connects to the external environment through daylight access and links to the EDR.

Attachments: a/s

cc: Director, BPBM; Director, OAFA; C. Nantham, OAFA-FM

OAFA: 09-009

MEMORANDUM ON THE REQUEST FOR BUDGET REALLOCATION FOR THE REHABILITATION AND REPAIR OF THE ATRIA ROOF AND CAFETERIA ROOF DECK

ASIAN DEVELOPMENT BANK
RECEIVED
31 JUL 2006
DIRECTOR GENERAL BPMSD

ADB
Asian Development Bank

Memorandum

Office of Administrative Services
Facilities and Asset Management Division

For approval of Paragraph 4

28 July 2006

To: Kensaku Munenaga
Director General, BPMSD

Through: Amarjit Wasan
Principal Director, OAS

From: Ken Chee
Director, OAFA

Subject: **Special Capital Project on Improved Daylight Access – Reallocation of Savings**

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1. In December 2003, the Board approved an amount of US $ 1.588 million for the improvement of daylight access for ADB atria and adjacent offices. The project was carried out to address the issue of insufficient natural light entering the ADB atria and affecting the comfort level of staff working next to the atria.

2. The initial approach selected to enhance daylight access into the atria was to replace the current composite structural roofs with a skylight system consisting of glass panels. However, further studies conducted showed that this approach is risky and uneconomical. In early 2005, it was decided to change the approach to a non-intrusive method by reflecting daylight into the atria using highly reflective or anadolic mirrors. This non-intrusive method of reflecting light into the atria was approved and the project was successfully completed in April 2006 with cost savings of approximately US $ 1.2 million, including contingency.

3. The non-intrusive method implemented did not require the replacement of the weather beaten roof, as highlighted in para 3 of our memo dated 25 February 2005 (Attachment 1). Having completed the objective of the project of bringing in natural light, we now plan to repair the atria roof, which is rotting and leaking in some areas.

4. We would therefore like to request that an amount of US $ 350,000.00 of the realized savings be reallocated to carry out the roof repair works. The remaining balance from this project may be used at a later date to enhance further daylight entry into the inner offices of the HQ building as highlighted in para 4 of the attached memo.

attachment: a/s

cc: R. Yeung, Director, BPBM; C. Reich, BPBM; H. Ohtsuka, BPBM; S. Mitra, OAFA-AP

2007 WORKSPACE SURVEY

Asian Development Bank ADB

ADB Workspace Survey

It has been almost a year since OAS completed the Atria Project and we are seeking some feedback. The survey should take about 5 minutes to complete.

The feedback will be evaluated collectively, as such, please answer as candidly as you can.

It's your workspace. It's your opinion that matters.

1.. Describe the **overall level of brightness** at your workspace

(a) sunny day	AND	**(b) overcast day**
○ Too dim		○ Too dim
○ Dim		○ Dim
○ Slightly dim		◉ Slightly dim
◉ Just right		○ Just right
○ Slightly bright		○ Slightly bright
○ Bright		○ Bright
○ Too bright		○ Too bright

2. Describe the **daylight** at your workspace on a...

(a) sunny day	AND	**(b) overcast day**
○ no daylight at all		○ no daylight at all
○ daylight is negligible		○ daylight is negligible
○ daylight is soft		◉ daylight is soft
◉ daylight is strong		○ daylight is strong
○ direct sunlight enters office		

3. How would you rate the **overall thermal comfort** (the combined effect of temperature, humidity and air movement) at your workspace ?

○ Very Uncomfortable
○ Moderately Uncomfortable
○ Slightly Uncomfortable
○ Slightly Comfortable
○ Moderately Comfortable
◉ Very Comfortable

4. Regarding the **balance** between **electrical and natural light**, which do you prefer?

○ Total reliance on daylight
○ Predominant reliance on daylight with supporting electrical light

- ○ Equal reliance on daylight and electrical light
- ◉ Predominant reliance on electrical light with supporting daylight
- ○ Total reliance on electrical light

5. Rate your **satisfaction** with the Atrium appearance since the Daylight Enhancement Project was completed.

- ◉ I very much prefer the Atrium after the renovation
- ○ I much prefer the Atrium after the renovation
- ○ I somewhat prefer the Atrium after the renovation
- ○ I somewhat prefer the Atrium before the renovation
- ○ I much prefer the Atrium before the renovation
- ○ I very much prefer the Atrium before the renovation

6. Do you experience **visual discomfort** from the Atrium space?

Frequency

- ○ Often
- ○ Occasionally
- ○ Rarely
- ◉ Never

Acceptable?

- ◉ Yes
- ○ No

7. What **overall effect** did the Daylight Enhancement Project have on your well-being e.g. improved morale?

- ◉ Positive
- ○ No change

8. Did the Daylight Enhancement Project make you more **productive** at work?

- ◉ Yes
- ○ No

9. Do you think it has become **more acceptable** to have an office facing the Atrium since the completion of the daylight enhancement project in April, 2006?

- ◉ Yes
- ○ No

10. If you had a choice, what would be your **preferred office type** at ADB. Please use the numbers 1 - 6 to indicate your choices in prioritized order.

6	An enclosed office with no windows
3	An enclosed office with an atrium window
1	An enclosed office next to an external window
5	An open plan office with no windows
4	An open plan office next to an atrium window
2	An open plan office next to an external window

Classification:

An **enclosed office** has full height partitions from floor to ceiling
An **open plan office** has 1.5m high panels between adjacent workspaces
An **external window** looks out of the ADB building
An **atrium window looks** into one of the two ADB atria

ADB Workspace Survey

11. Which of the following options best **describes** your **workspace** ?

- ○ An enclosed office with no windows
- ○ An enclosed office next to an atrium window
- ○ An enclosed office next to external window
- ○ An open plan office with no windows
- ○ An open plan office next to an atrium window
- ◉ An open plan office next to an external window

12. Which is the **nearest lift core** to your **workspace** ?

- ◉ West core
- ○ East core
- ○ North core
- ○ South core

13: On which **floor** is your **workspace** situated?

- ○ Basement
- ◉ Ground level
- ○ 1st floor
- ○ 2nd floor
- ○ 3rd floor
- ○ 4th floor
- ○ 5th floor
- ○ 6th floor
- ○ 7th floor
- ○ 8th floor
- ○ 9th floor

Submit

MEMORANDUM ON THE MARCH 2007 STAFF FEEDBACK SURVEY

ADB
Asian Development Bank

ASIAN DEVELOPMENT BANK
RECEIVED
22 MAR 2007
Vice President
(Finance and Administration)

Memorandum
Office of Administrative Services
Office of the Principal Director

21 March 2007

To: Khempheng Pholsena
Vice President, Finance and Administration

From: Amarjit Wasan
Principal Director, OAS

Subject: Improved Daylight Access Project – March 2007 Staff Feedback Survey

---

Background

1. In December 2003, the Board approved a capital budget of US$1.6M for the "Improved Daylight Access for the ADB Atria and Adjacent Offices" project.[1] Following a review of the various methodologies to execute the project, the President approved in February 2005 the non-intrusive method of bringing in natural daylight into the Atria. Detailed design and construction works began in the same year and the project was completed in April 2006, ahead of schedule and under budget. Using the new methodology, the expenditure incurred amounted to US$392,969.00. In a memorandum to the President in April 2006, PD, OAS stated that feedback from staff will be sought after project completion to review the benefits of the project. The survey was completed as planned in March 2007.

Post Project Survey

2. To determine if the project will indeed be beneficial, it was proposed during project inception that a post project survey be carried out, approximately one year after project completion. The one year gap was essential to allow staff to be accustomed to the new day-lighting system and hence be able to give a more accurate account of how the increased day-lighting affected their workspace environment. The post project survey was conducted in mid March 2007.

Survey Methodology and Results

3. There were two groups of staff totaling 133 members, to whom the survey forms were sent by email. The first group consisted of 80 staff members who were seated in and around offices facing the atrium before and after the completion of the project. The second group comprised of staff with work areas away from the atrium and they acted as the control group for

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[1] The Improved Atria Daylight Access Project was undertaken primarily to bring in more natural daylight through the ADB atria. The luminance level inside the ADB atria and adjacent offices was considered to be insufficient when compared to international standards for daylight of indoor spaces. It was also well below that available in other newer buildings in Manila. Many ADB personnel viewed the building interior as gloomy, influencing their workspace comfort level. The shortage of natural light also created the problem of offices adjacent to external windows being perceived as far more desirable than those overlooking the atria. This created a higher demand for office space along the building's perimeter that cannot be met due to space limitations.

statistical purposes. Sixty four (64) staff members responded to the survey with 73% of the respondents having offices facing the atrium.

4. The results of the survey may be summarized as follows:

- **94%** of the respondents prefer the Atria after the project was completed,
- **56%** of the respondents indicated that the project had positive effect on their morale,
- **56%** of the respondents indicated that the project has increased their productivity,
- **68%** of the respondents indicated that it has become more acceptable to have an office facing the Atrium,
- **89%** find the visual discomfort[2] from the atria acceptable. Only **5%** indicated that they often experienced visual discomfort from the atria

Conclusion

5. Based on the results of the staff survey, it may be concluded that the project has successfully achieved its objectives. OAS will continue to monitor the project impact and may make further improvements in future if necessary.

cc: Vice President (Operations 1); Vice President (Operations 2); Vice President (Knowledge Management and Sustainable Development); Managing Director General; Chief Advisor to President; K. Munenaga, Director General, BPMSD; R.C. Yeung, Deputy Director General, BPMSD; P. Daltrop, Principal Director, COSO; R. Dawson, Principal Director, OIST; R.E. Budiman, Assistant Controller, CTAC; K. Chee, Director, OAFA; J. R. Cooney, Director, SEID; Ann Quon, Director, DER; Tilak Sen, Director, BPBM; R. Renfro, EARD; F. C. Kawawaki, SERD; Mukhtar Khamudkhanov, SPD; Karin Oswald, Staff Council; S. Mitra, OAFA-AP; C. Nantham, OAFA-FM

OAFA-AP-2007/021

[2] Visual discomfort caused by glare effect from sunlight.

ATRIA BEFORE AND AFTER RETROFIT

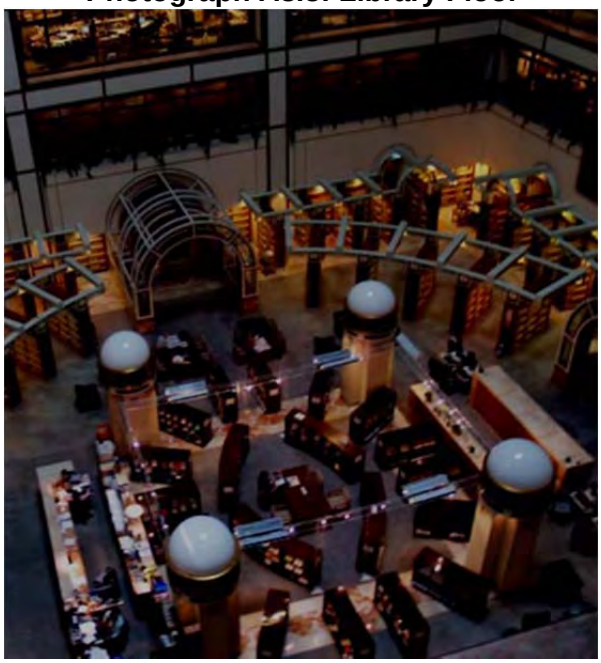
Before Retrofit (February 2005)

Photograph A8.1: Atrium Roof

After Retrofit (May 2006)

Photograph A8.2: Atrium Roof

Photograph A8.3: Library Floor



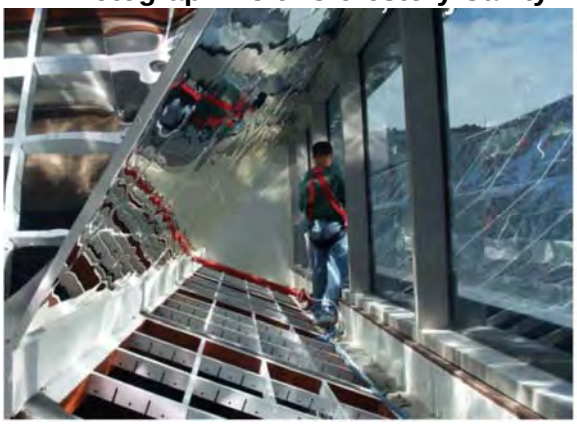
Photograph A8.4: Library Floor

Before Retrofit (February 2005)

Photograph A8.5: Clerestory Cavity

After Retrofit (May 2006)

Photograph A8.6: Clerestory Cavity



Photograph A8.7: Roof and Clerestory Windows

Photograph A8.8: Roof and Clerestory Windows

Photograph A8.9: Roof and Clerestory Windows

Photograph A8.10: Roof and Clerestory Windows