

Appendix 6-1

**BOCOG's
Environmental
Protection Guidelines
for Olympic Projects**

奥运改扩建工程环保指南

一、前言

“绿色奥运，科技奥运，人文奥运”是北京 2008 年奥运会的三大主题。在 2008 年奥运场馆建设中，除了新建场馆之外，还有不少比赛场馆将由现有场馆改扩建而成。充分利用城市现有场馆和设施，减少新建工程量是绿色奥运的重要内容和体现。为了促进北京市的可持续发展，实现“绿色奥运”的承诺，北京奥组委和奥科委组织有关科研院所对奥运改扩建场馆和工程中关系到环境保护的主要领域进行研究，在我国现行标准的基础上，参考先进可行的国际环保标准，编制了《奥运改扩建工程环保指南》（以下简称《指南》）。

本《指南》是对奥运改扩建场馆和工程的基本环保要求。在奥运改扩建场馆和工程的规划、设计、施工等过程中除应严格执行国家、地方的相关标准和规定外，还要符合本《指南》提出的环保要求。

在奥运改扩建工程中体现“绿色奥运”理念，贯彻科学发展观的“可持续”理念，充分利用城市现有场馆和设施，减少新建工程量，是“绿色奥运”的重要内容和体现。因此，奥运改扩建工程应以“安全性和比赛要求须满足，舒适性标准量力而行”为原则，以“勤俭办奥运”为指导思想，结合场馆赛后利用，对现有场馆进行改扩建。

在改扩建设计和实施中应尽可能保留和利用既有建筑与设备系统，减少改扩建工程量和投资；积极采用环保措施，提高资源和能源利用水平；对拆除的材料和设备进行回收和再利用，防止和减少环境污染。

奥运场馆与设施的改扩建问题包含三个层面的内容：首先是更新改造程度的确定，即通过评估确定既有建筑及其构件和设备系统等可保留与利用的程度；其次是更新改造的设计与施工；第三是对拆除的材料、设备与废弃物的处理与利用。

对既有建筑和设备系统的评估，第一是使用年限的评估，即保证在 2008 年举办奥运会时，既有建筑与设备系统还处在设计的使用年限（即寿命）之内，并保留一定的余度；第二是进行性能状态与运行工况评估，与原设计的性能指标进行比较，并考察系统的稳定性与可靠性，除了对其当前状况进行评估，还要对 2008 年的状况进行预测；第三是评估对 2008 奥运功能满足的程度。

在评估的基础上，确定对既有建筑和设备系统的处理方案，进行改扩建的技术设计。设计目标和采取的技术措施应满足绿色奥运建筑的环保要求。

此外，改扩建工程的环保要求中还要重视拆除材料、设备、家具等的回收

和再利用问题。这是改扩建建筑中与新建建筑相比较为特殊的地方，应遵循较高的环保原则并制定相应的资源化措施。

二、具体要求

本《指南》主要对以下八方面内容提出要求。

1. 建筑结构

(1) 对改扩建场馆原有的结构进行安全性评估，保证奥运期间比赛要求和赛后利用，确定保留、加固、更新或拆除的程度；

(2) 奥运场馆的改扩建工程应统筹考虑，最大限度地利用原有结构，减少拆除和增建的工程量；

(3) 对要拆除的结构或构件，应合理规划拆除工艺和流程，应避免对原有结构保留部分的损伤，最大限度地减少对周边环境的直接干扰和影响；

(4) 拆除工艺和流程的选择，应考虑有利于结构件和结构材料的利用或回用，降低结构构件和结构材料的利用或回用成本，间接减小拆除作业的环境负荷；

(5) 加固、维修、增建方案的选择应注意尽可能地降低施工难度，并有效控制对邻近建筑和周边环境的不利影响和干扰。

2. 建筑节能

(1) 在满足奥运比赛要求、体育场馆相关要求和标准的前提下，充分考虑场馆赛后利用的需要，对既有建筑围护结构热工性能、现有能源系统及设备的使用年限和性能（包括采暖空调、照明、供配电、自动控制系统及设备）进行评估，以确定是否留用及改造规模。对仍可继续使用的，应尽量留用；

(2) 改扩建场馆外围护结构的热工性能指标宜满足公共建筑节能设计标准的要求。当建筑围护结构继续保留使用时，应在对装修改造工程进行设计的同时进行热工性能的改造设计。改扩建场馆外围护结构的改造应进行建筑材料和建筑构件的合理选用和围护结构构造的优化设计，鼓励在技术经济合理的前提下采取有效的加强自然通风、保温隔热和遮阳的措施；

(3) 现有冷热源系统的设计能力及空调设备的设计功能（荷载）应能满足奥运比赛和场馆赛后利用的冷热负荷设计要求，如不满足则应考虑改扩建对策，优先选用与现有设备相匹配的新增设备；

(4) 应在技术经济合理的前提下，按照提高冷热源系统能量转换效率和输配系统效率的原则对评估中不满足要求的能源形式和系统设备等进行改造设计，以节约能耗；

(5) 新能源系统设计应尽可能考虑合理利用太阳能等可再生的清洁能源。应优先考虑能源利用效率较高的供能方式,尽可能避免能源的直接低质利用(如燃气锅炉、电锅炉等)。如果有天然气等一次能源作为输入能源,则优先考虑采用热、电、冷联供的形式和回收燃气余热的燃气热泵形式,对于以电为主要输入能源的系统,可以选取各种形式的电动热泵;

(6) 新风量比较大的比赛场馆,应采取切实有效的热回收措施;

(7) 应在满足比赛使用要求的前提下和赛后利用的角度考虑自然光的充分利用,以减少人工照明能耗。在资金预算满足的前提下,可采用清洁能源和绿色环保型节能照明设备,实施绿色照明,优化照明控制,减少照明系统能耗;

(8) 管道的设计能力应能满足改扩建后的设计要求,如不满足则应予以更新。管道保温不应有明显破损、表面结露的现象,供水或送风管路的末端不应有温降过大的现象,阀门不能有漏水或关闭不严的问题,否则须予以更换。

3. 拆除材料与固体废弃物资源化

(1) 奥运改扩建场馆的拆除材料必须进行资源化处理和再利用;拆除材料进行资源化处理时,必须满足“减量化、无害化、资源化”的要求;已超过使用期限或属于目前国家明令禁止和限制使用范围内的拆除材料不得再用于奥运改扩建工程;

(2) 对于可以再利用的建筑构件尽量保留;尽可能减少拆除量。对于可能重新利用的拆除材料,可直接利用的就地直接再利用或折价进入市场;对于须再加工利用的拆除材料,有条件的可在现场处理后就地再利用;最终不能利用的固体废弃物按照市政管理部门的要求运往指定消纳场所;含有害物质的固体废弃物的处置应经有关环保机构认可;

(3) 拆除的材料应按材性分类建立拆除材料档案。拆除材料的回收应用须包括拆除材料的分类组成、利用方案、有效利用措施及各种材料的现场利用率指标等;

(4) 拆除材料要实行分类存放,现场及时回收,就地利用,提高回收利用效率。工地宜建立拆除材料专用场地,用来分类、收集、储存和预处理各类拆除材料。拆除材料再利用前,必须要经过检验,确保不含对环境及人体健康有害的物质(如石棉等);

(5) 拆除的家具经过简单处理可以满足使用要求的,可以继续用于改扩建场馆。不符合奥运场馆使用标准的家具,鼓励降级使用或异地再利用。

4. 装饰、装修材料

(1) 新增装饰装修部分需满足《奥运工程环保指南—绿色建材》部分的要

求；

(2) 必须满足现行的国家或行业的相关产品质量标准；所用装饰装修材料的有害物质限量要求执行现有国家标准（GB18580~18589-2001）。已被国家和北京市明令禁止和限制使用的建材产品不得用于奥运改扩建工程；

(3) 所用装饰装修材料的选择要考虑其在使用时对环境的影响和人体安全因素，含有放射性的装饰装修材料必须全部使用放射性水平为 A 类的产品；

(4) 鼓励使用可再利用或可再生的装饰装修材料；鼓励使用先进、具备高新技术含量的新型装饰装修材料，以满足奥运改扩建场馆工程的隔音、保温、节能、防火、防水及便于拆卸等要求。

5. 水系统

(1) 首先应对现有给水、排水系统进行评估。若在 2008 年奥运举办之时，水系统已超过设计使用年限的 70%（设备）和 80%（管道），则应在改扩建预算许可的情况下予以更新。对未超过上述设计年限的设备和管道系统再进行运行工况与性能评估以及使用功能要求满足程度评价，以确定系统是否需要更新、改造和增补；

(2) 从系统节水的理念出发对不满足要求的水系统进行改造，尽量选用节水设备、器具和使用环保、可回收再利用的管材；

(3) 积极采用先进技术设备实现污、废水资源化。在满足用水安全要求的情况下，尽可能使用市政供再生水，或就地处理回用优质杂排水。再生水供水系统安全性要求和水质标准与新建场馆相关要求相同；

(4) 如已计划进行屋面改造，则应同步改造屋面雨水收集和排放系统，规划地表径流雨水汇流，避免雨水被污染。收集雨水、地表径流雨水，因地制宜净化回用或就地回渗。绿地的浇灌系统要充分节水。

6. 室内环境

(1) 室内环境改造首先应遵循“保证奥运比赛要求，非比赛区舒适性要求量力而行”的原则，对现有场馆室内声、光、热环境和空气质量进行评估，确保改扩建体育场馆建筑室内声、光、热环境和空气质量满足各类竞赛场馆要求和国家标准；

(2) 改扩建场馆建筑隔声性能不应低于中华人民共和国国家标准 GBJ118-1988《民用建筑隔声设计规划》的要求；

(3) 自然采光应符合 GB/T 50033-2001《建筑采光设计标准》的规定。如果有大面积透明围护结构情况下，要设置可调节的或固定的遮光设施与眩光防止设施，避免日射导致的眩光，并保证在奥运比赛需要时能够有效遮挡室外自然

光；

(4) 比赛场馆室内照明改造后应满足奥运比赛的标准，普通建筑照明改造后应满足 GBJ133-1990《民用建筑照明设计标准》的规定；

(5) 应充分考虑通过简单有效的围护结构改造，如增加遮阳设施、加强自然通风、加强保温隔热等措施来提高室内热舒适度和空气质量；

(6) 改扩建中应合理设计新风取风口，保证可以提供足够的新风量，防止由于空调通风系统设计不当而导致室内空气质量恶劣。

7. 绿化

(1) 改扩建场馆应符合北京市地区景观生态类型、功能的有关规定和绿化要求。改扩建后场馆的绿化率应尽可能达到城市规划要求和有关绿化法规规定的标准，且不宜低于改扩建前的绿化率；

(2) 改扩建过程中要注意场地内原有乔木和成材树木的保护；

(3) 园林植物种植规划与设计总体上应参照《北京市园林局关于城市绿地植物种植若干意见》(市政府京政办发[2001]55号)的相关要求；

(4) 对于原有绿化形式单一、生态效应不明显的场馆，改扩建后宜采用乔、灌、花、草有机搭配等多样化绿化手段，同时应考虑植被的多样性及物种的本地化。

8. 臭氧层保护

(1) 现场作业中不得使用含 CFCs 类物质作为发泡剂；新空调、制冷设备及消防设备不得使用 CFCs 及其他含有对臭氧层有不利影响的物质的工质作为其制冷剂。

(2) 场馆内所用设施，如观众座椅、体育器材、办公家具等应优先采用其产品在生产过程中使用消耗臭氧层物质(ODS)替代技术的产品。

三、其他要求

1. 对于静态的建筑构件和设备管线，在 2008 年其使用年限应处于设计寿命的 80%之内，例如建筑的结构体系设计寿命是 60 年，则在 2008 年应处于建成之后的 48 年以内；对于动态的设备，使用年限应处于设计寿命的 70%之内。满足上述要求的，则可评估为使用年限合格；如果使用年限处于设计寿命的 50%之内，则可评估为使用年限良好。对于使用年限不合格的既有建筑及构件和设备系统，应对其安全性做重点检查，原则上应予以拆除，进行更新；如安全性经专业评估认定有足够的保障，亦可予以保留。

2. 改扩建场馆外围护结构的热工性能指标宜满足公共建筑节能设计标准

的要求，建筑物各部分围护结构的传热系数、遮蔽系数，不宜超过下表的规定限值。

附表 6-1 围护结构各部分的传热系数和遮蔽系数限值

屋 顶		外 墙	外 窗		玻 璃 幕 墙	
非透明	透明		传热系数 K [W/(m ² ·K)]	遮阳系数 SC	传热系数 K [W/(m ² ·K)]	遮阳系数 SC
0.70	2.8	1.00	2.8	0.7	2.8	0.7

3. 现有冷冻机及锅炉到 2008 年奥运期间的使用年限不得超过其设计年限的 70%，同时其效率须达到额定效率的 80%以上，否则应予以改造或更换。

4. 空调系统设备，包括空调箱、风机盘管、各类水泵及风机，到 2008 年奥运期间的使用年限不得超过设计年限的 70%，否则应予以更新。现有空调设备的工作效率(以设计工作点的效率作为参考值)应达到额定效率的 90%以上，否则应进行改造或更新。

5. 对于金属材料包括钢材、铝材、合金材料(不锈钢和铜制品)等，其中拆除较为完整的金属构件，经过检验后可以直接利用。现场其他废金属材料经分检集中后交废品收购部门。对于废混凝土、废砖瓦等，拆除较为完整的砖瓦直接利用。废混凝土和砖瓦等经过预处理，可以制备再生粗集料和混合料，用于制备低强度等级混凝土及其各种建材制品，如墙体砌筑材料(砖、砌块、砌筑砂浆、抹灰砂浆、打混凝土垫层等)、道路和市政材料(铺道砖、花格砖等建材制品)等，同时还可作为水利、道路、市政工程的基础材料。回收的废玻璃经分类、清洗后，一部分废玻璃经挑选后直接用于重新应用(如制镜或作玻璃饰面材料)等，一部分废玻璃熔化焙烧后制作玻璃马赛克、泡沫玻璃、微晶玻璃、玻璃微珠、玻璃饰面砖等，还可以用碎玻璃代替骨料制造砖和混凝土等制品。塑料包括塑料管材、塑料板材、塑钢制品等，除质量完好可直接利用外，大部分废塑料制品不可再利用，集中运送到指定地点消纳。木材包括地板、木墙裙、木窗框等木制品。质量较好的木材可直接利用，有些木制品可降级使用或异地使用。废硬质材料如废石材、废陶瓷等，可粉碎后作为骨料用于制作混凝土；

6. 奥运改扩建场馆所用装饰装修材料主要包括人造板、涂料、陶瓷砖、石材、壁纸、地板革、地毯、家具(包括座椅)、装饰板材、吊顶材料、保温材料等；

7. 自然采光强化设施包括：反光板、反光镜、集光装置、光导管、光纤等设施；可调控遮光设施有遮光或散射的作用，可用于避免阳光直射的眩光，可控遮光设施包括：外(中)遮阳百页、遮光幕、不透光遮光设施等。

Environmental Protection Guideline of Olympic Rebuilding and Extending Projects

I. Foreword

“Green Olympics, High-tech Olympics and People’s Olympics” are the three major themes of Beijing 2008 Olympic Games. In the construction of venues for the 2008 Olympics, other than new ones, many are going to be rebuilt or extended on the basis of the existing ones. We need to fully utilize the existing venues and facilities and reduce the number and amount of new projects. This reflects the content and concept of “Green Olympics”. To achieve the sustainable development of Beijing city and realize our promise of “Green Olympics”, BOCOG and Olympic Games Science and Technology Committee have organized related research institutes to study the environmental protection issues in constructing Olympic rebuilding and extending venues and projects. Following the current practice in China and referring to advanced and feasible international environmental protection standards, this “Environmental Protection Guideline of Olympic Rebuilding and Extending Projects” (Guideline) comes into being.

The Guideline reflects the basic requirements of environmental protection for the Olympic rebuilding and extending venues and projects. The planning, designing and constructing of Olympic rebuilding and extending venues and projects shall meet the requirements of environmental protection proposed by the Guide as well as the related national and local standards and regulations.

The Olympic rebuilding and extending projects shall reflect the idea of “Green Olympics” and implement the concept of sustainability in the idea of scientific development. To make full use of current venues and facilities to reduce new projects reflects the concept of “Green Olympics”. Thus the Olympic rebuilding and extending projects should adhere to the principles of “security and competition first, adequate comfortability” and follow the directing idea of “Thrifty Olympics”, taking into account the usage of venues after the Games.

In the design and implementation periods of the rebuilding and extending projects, existing buildings and equipment systems should be preserved and utilized as much as possible to reduce the number and investment of rebuilding and extending projects; environmental protection measures should be adopted to raise the standards of utilizing resources and energy; dismantled materials and equipment should be recovered and recycled to reduce environmental pollution.

The rebuilding and extending of Olympic venues and facilities includes three aspects of contents: firstly, the determination of the renovation degree, namely, to decide the degree of retaining and utilizing of the existing buildings and their components and equipment systems through evaluation; secondly, the designing and constructing of renovation; thirdly, the

processing and utilizing of dismantled materials, equipment and castoffs.

Evaluating existing buildings and equipment systems: firstly, assessing the working life to ensure that the existing buildings and equipment systems be within the designed working life, reserving some margin of time; secondly, evaluating performance status and running conditions, comparing with the performance standard originally designed and checking the stability and reliability of the system. Besides assessing the present conditions, the conditions in the year 2008 should also be predicted; thirdly, to evaluate the degree of satisfying the needs of 2008 Olympic Games.

On the basis of evaluation, a plan of handling existing buildings and equipment systems should also be determined, carrying out the technical design of rebuilding and extending. The goal of design and adopted technical measures should meet the needs of environmental protection requirements for Green Olympic buildings.

Besides, the environmental protection requirements of rebuilding and extending projects should pay attention to the recovering and recycling of dismantled materials, equipment and furniture, etc. This is quite different from the new buildings. High environmental protection standards and corresponding measures of resourcing should be followed.

II. Specific requirements

The Guideline mainly provides requirements on the following 8 aspects.

1. Architectural structure

(1) Carry out safety evaluation on the original structure of venues to ensure that it can meet the needs of events during the Games and can be changed for other purpose after the Games, and decide the degree of reserving, strengthening, renovating and dismantling.

(2) Plan as a whole the rebuilding and extending projects to make maximum use of the original structures and to reduce the amount of the work of removing and expanding.

(3) For the structures and components to be removed, plan a proper way and procedure of removing to avoid the damage of reserved original components and to reduce the direct disturbance and influence on the surroundings as much as possible.

(4) The choice of removing ways and procedures should take the following into account: to reuse the using and recycling of structural components and materials; to reduce the cost of the using and recycling and to decrease indirectly the environmental burden of removing.

(5) The choice of schemes of strengthening, repairing and expanding should lower the difficulty of constructing as much as possible and control the negative influence and disturbance on adjacent buildings and surrounding environment.

2. Energy conservation of architectures

(1) With the prerequisite of satisfying the requirements of Olympic Games and related requirements and standards of venues and fully considering the needs of post-Games usage, evaluate the heat engineering performance of the existing architectural surrounding structures and the working life and performance of existing energy systems and equipment (including HVAC, lighting, power supplying, automatic control system and equipment etc.) to decide whether to reserve or not and to decide the scope of renovation. Reserve those useable as much as possible.

(2) The heating engineering performance standards of the surrounding structure outside the rebuilding and extending stadiums should meet the requirements of energy conservation design standard for public buildings. When the architectural surrounding structures are reserved, renovation design of heating engineering performance should be carried out as well as renovation design of thermal performance. The renovation of the surrounding structure outside the rebuilding and extending venues should include the proper choice of building materials and components and the optimizing design for the construction of surrounding structures. Measures of increasing ventilation, thermal retardation and shading are welcome on proper technical and economical basis.

(3) The designed capacity for the cooling and heating source system and air-conditioning equipment should satisfy the designed requirement for cooling and heating burden during and after the Olympic Games. Otherwise, rebuilding and extending measures should be considered, first adopting the new equipment compatible to the existing one.

(4) With proper technical and economical conditions, following the principle of raising the energy transmission efficiency of the cooling and heating source system and the efficiency of transmission and distribution systems, renovating design should be implemented for the energy forms and system equipment disqualified in the assessment to save energy consumption.

(5) The design of new energy systems should take into consideration as much as possible utilizing properly the regenerative clean energy, such as the solar energy. High-efficiency energy supply forms are preferred to avoid the direct low-efficiency usage of energy (such as gas boiler, electric boiler, etc.). If one-time energy such as natural gas is available as input energy, joint supply of heat, electricity and cooling, and gas heating pump for recovering exhaust heat should be considered first. Electric heat pump of various forms may be selected for the system taking electricity as the main input energy.

(6) For the venues with large fresh air volume, effective heat recovery measures should be taken.

(7) On the condition of satisfying requirements of the Games and for the sake of post-Games usage, natural light should be fully used to reduce energy consumption by artificial lighting. If budget permits, clean energy sources and environmentally green

energy-saving lighting equipment may be adopted to implement green lighting, to optimize lighting control and to reduce lighting system energy consumption.

(8) Capacity designed for pipelines should satisfy the requirements of design after rebuilding and extending. Otherwise, they should be changed. The thermal retardation should have no apparent breakage and surface condensation. The ends of pipelines for water supply and ventilation should have no big heat drop. Facets should have no leakage and loose closing. Otherwise, they must be changed.

3. The resourcing of dismantled materials and solid castoffs

(1) The dismantled materials of Olympic rebuilding and extending venues must undergo resourcing and recycling process. Before resourcing, the requirements of "low-volume, innocuous, and resourceful" must be attained. The dismantled materials exceeding the term of usage or being clearly forbidden and restricted of use must not be used in the projects.

(2) Reserve the architectural components that may be used again to reduce the amount of removing as much as possible. Materials that may be used again can be recycled on the spot or sold in the market. Materials that need processing may be used after processing on the spot. Those unusable solid castoffs must be moved to specified disposal places following the directions of municipal management department. The processing of solid castoffs with harmful substances must be acknowledged by related environmental protection institutions.

(3) A file of dismantled materials should be established following the classification of material qualities. The recovering for use of dismantled materials should include classification, plan of usage, effective usage measures and on-site usage rate standard.

(4) The dismantled materials should be stored by classification, recovered timely on-site and used on the spot to raise the recovery usage efficiency. Special field for dismantled materials should be established at the construction site to classify, collect, store and preprocess various removed materials. Before recycling, the materials must be checked to ensure that they are free of harmful substances (such as asbestos, etc.).

(5) The dismantled furniture that may be used again after simple handling can be used in the rebuilding and extending venues. The furniture not reaching the standard of Olympic venue is to be used in a degraded way or to be used in other places.

4. Decoration and furnishing materials

(1) The new decoration and furnishing should follow the requirements specified in *Guideline of Olympic Project Environmental Protection——Green Building Materials*.

(2) Current related national product quality standard must be followed. The limit for harmful substances in the materials of decoration and furnishing must follow the current national standard (GB18580~18589-2001). Building materials clearly forbidden or restricted

of use by the State and the Beijing Municipal Government must not be used in the Olympic rebuilding and extending projects.

(3) The choice of materials should consider the influence on environment and human bodies. All radioactive materials must be A-class in radioactive standard.

(4) Materials that may be used again or recycled are preferred. Advanced and high-tech new materials are also welcome to satisfy the requirements of sound isolation, thermal retardation, energy conservation, fire-resistance, water-resistance and easy disassembly.

5. Water system

(1) First, assess the existing water supply and drainage system. If, by 2008 Olympics, the water system has exceeded the designed working life by 70% (equipment) and 80% (pipelines), it should be renovated if the budget permits. For the equipment and pipeline systems not exceeding the above-mentioned working life, the working conditions and performance should be assessed again and the degree of satisfying the functioning requirement must be reevaluated to decide whether the system needs renovating, repairing and expanding.

(2) Adhering to the idea of water conservation, renovate the water systems not meeting the needs. Choose water-conservation equipment, utensils and environment-friendly, recyclable pipeline materials.

(3) Adopt positively advanced technology and equipment to realize the resourcing of sewage and effluent. Safety as a prerequisite, use reclaimed water supplied by municipal departments or process and use high quality mixed drainage water. The safety requirement and quality standard of the water supply system for reclaimed water should be the same as the requirements for new venues.

(4) If roof renovation has been planned, roof rain collecting and drainage system should be renovated synchronously. The ground flow junction should be planned to prevent rain from being polluted. Collect rain and its ground flow, purify for use or seep on the spot. The irrigating system of the green land should save water as much as possible.

6. Indoor environment

(1) The indoor environment renovation should follow the principle of "ensuring Olympic competitions and maximizing comfortability in non-competition area". Assessment on the indoor audio, lighting and heating environment and air quality should be carried out to ensure that they reach the requirements of various venues and national standards.

(2) The sound isolation performance of rebuilding and extending buildings should not be lower than the requirements specified in the national standard of the P. R. C. GBJ118-1988 *Sound Isolation Design Scheme for Civil Buildings*.

(3) Natural lighting should comply with the regulations of GB/T 50033-2001 *Designing Standard for Architectural Lighting*. In the case of having large-scale surrounding structures, adjustable or fixed shelter or blazing light prevention facilities should be installed to avoid blazing light and effectively shelter outdoor natural light.

(4) Venue indoor lighting after renovation should comply with the standard of Olympic competition. Common architectural lighting after renovation should comply with the regulations in GBJ133-1990 *Designing Standard for Civil Architectural Lighting*.

(5) Simple but effective measures, such as increasing shading facilities, natural ventilation and thermal retardation, should be taken to increase the indoor heating comfortability and air quality.

(6) Appropriate design of fresh air entrance can ensure adequate fresh air avoiding low indoor air quality due to improper design of air-conditioning ventilation system.

7. Landscaping

(1) The rebuilding and extending venues should be in conformity with the related regulations and landscaping requirements on the type and function of the scenery ecology of Beijing city. The green land rate should reach the municipal planning requirements and standards specified by related landscaping codes, not lower than that before rebuilding and extending.

(2) The protection of original arbor and timber trees must be emphasized in the process of rebuilding and extending.

(3) The planning and designing of landscape planting shall refer to the related requirements in *Several Suggestions on Urban Green Land Planting by Beijing Garden Bureau* (Municipal Government JINZHENBAN [2001] No.55).

(4) After rebuilding and extending, the venues with single greening forms and low ecological effects should adopt various types of greening such as arbor, bush, flower and grass, taking into account the variety of vegetation and the localization of species.

8. Ozone layer protection

(1) On-site construction should not use substances with CFCs as blisters. New AC, freezing equipment and fire fighting equipment should not use substances with CFCs and other elements harming the ozone layer as the cold-producing medium.

(2) Facilities inside the venue, such as spectator seats, sports apparatus, office furniture, should preferably adopt the products using ODS replacing techniques in the process of manufacturing.

III. Other requirements

1. The working life by 2008 of static architectural components and equipment pipelines should not exceed 80% of its designed expectancy. For example, if the designed expectancy of structural system is 60 years, it should be within 48 years after its establishment by 2008. The working life of dynamic equipment should be within 70%. If the above requirement is satisfied, it can be assessed as qualified working life. If the working life is less than 50% of designed expectancy, it can be assessed as functioning well. For those existing buildings, components and equipment systems that failed the assessment, careful safety check should be implemented. In principle, it should be removed and renovated. If its safety condition is guaranteed through professional evaluation, it may also be preserved.

2. The heat engineering performance standard of the surrounding structures outside the rebuilding and extending venues should meet the needs of energy conservation design standard for public buildings. The coefficients of heat transmitting and sheltering of all the surrounding structures should not exceed the limits regulated in the following table.

Appendix table 6-1 Limits on the coefficients of heat transmitting and sheltering

Roof		Outside wall	Outside window		Glass curtain wall	
Non transparent	Transparent		Heat transmitting coefficient K [W/ (m ² · K)]	Sheltering coefficient SC	Heat transmitting coefficient K [W/ (m ² · K)]	Sheltering coefficient SC
0.70	2.8	1.00	2.8	0.7	2.8	0.7

3. By 2008, the working life of existing freezing machines and boilers should not exceed 70% of its designed working life. At the same time, the efficiency should be more than 80% of the rated efficiency. Otherwise, it should be changed or renovated.

4. By 2008, the working life of the air-conditioning system equipment (including the air-conditioner cabinet, fan coil, various pumps and fans) should not exceed 70% of the designed working life. Otherwise, it should be renovated. The working efficiency of the existing air-conditioning equipment (refer to the efficiency of designed operating point) should be more than 90% of the rated efficiency. Otherwise, it shall be repaired or renovated.

5. For metal materials such as steel products, aluminum products and alloy materials (stainless steel or copper products), relatively complete dismantled metal components may be used again after check. Other waste metal materials may be moved to salvage station after classification and collection. For waste concrete and waste bricks and tiles, relatively complete dismantled bricks and tiles may be used again directly. Waste concrete and waste bricks and tiles may, after pre-processing, be used to make reproductive coarse aggregate and

mixed materials, which can be used to make low-intensity concrete and various construction materials. For example, wall building materials (bricks, building blocks, masonry mortar, plastering mortar and bedding for concrete), road and municipal facility materials (such as pavement bricks, lattice bricks). They can also be used as foundation materials for hydraulic engineering, road and municipal projects. After classifying and cleaning, some waste glass reclaimed may be used directly (in mirror-making and glass face materials). After melting and burning, some waste glass may be used to make glass mosaic, foamed glass, microcrystal glass, glass micro balls and glass face bricks. And broken glasses can also be used to replace aggregate to make bricks and concrete. Plastic includes plastic tubing, plastic board, plastic steel products and so on. Except those of good quality that may be used directly, most waste plastic products cannot be used again and must be moved to specified place to destroy. Wood products include floor, wood dado, wood window frame and so on. High-quality wood may be used again directly. Some wood products can be degraded for use or used somewhere else. Hard waste materials such as waste stone or porcelain may be pulverized to be the aggregate of making concrete.

6. The decoration and furnishing materials used in the Olympic rebuilding and extending venues mainly include man-made board, coating material, porcelain brick, stone, wall paper, floor leather, carpet, furniture (including chairs), decoration boards, ceiling materials and thermal retardation materials, etc.

7. Strengthening facilities for natural lighting include reflecting board and mirror, light collecting device, optical pipe and fiber. Adjustable shading facilities have the effect of shading and scattering and may be used to avoid the blazing light from direct sunshine. Adjustable shading facilities include outside (medium) shading shutter, shading curtain and light-tight shading facilities, etc.

奥运临建工程环保指南

一、前言

奥运会是目前世界上规模最大、影响最广的体育赛事之一，其比赛项目种类多，比赛场馆规模大。由于奥运比赛使用是短时间的，所以为了减少建设经费，减轻财政负担，并满足场馆的赛后利用和可持续发展的要求，通常需建设大量的临时性建筑以满足奥运会期间的特殊需求，而在会后予以拆除。这些临时性建筑包括临时性场馆、临时设施以及永久场馆中为满足赛事需要加建而在会后立即拆除的临时座席、临时用房及临时设备。

为了促进北京市的可持续发展，实现“绿色奥运”的承诺，北京奥组委和奥科委组织有关科研院所对奥运临建工程中关系到环境保护的主要领域进行研究，在我国现行标准的基础上，参考先进可行的国际环保标准，编制了《奥运临建工程环保指南》。其指导思想是：

1. 临时建筑与设施的建设应依据“勤俭办奥运”的原则，体现“绿色奥运”理念，实现可持续发展的目标；
2. 临时建筑与设施的建设优先选用或租用工业化、标准化产品，如成品卫生间、成品临时房屋及成品临时绿化等；
3. 临时建筑与设施的建设不应对环境产生不良影响。

二、规划要求

1. 场地选择满足城市总体规划

(1) 临时场馆设施不宜靠近危险源（如输电高压走廊、危险品仓库、燃气调压站等）及污染源。由于场地限制，临时场馆设施的建设用地可能靠近危险源及污染源的，应保证其与此类设施保持国家相应规范规定的距离；

(2) 临时场馆设施不应建设在城市生态保护区和文物保护区范围内；否则需经过论证确保其对环境的负面影响降到最小程度时方可实施；

(3) 独立建设的临时场馆设施用地宜选择周边交通便利，市政设施相对完善的城市公共用地及规划建设用地；

(4) 临时场馆设施的建设应优先选用对建设场地改造费用较少的土地；

(5) 场地选择应充分考虑建筑的防灾与减灾，避免将其建设在建筑密度高的地区。

2. 场地选择符合用地总平面规划

(1) 建设用地内附建的临时场馆设施不应占用规划用地内的消防车道，其中对于在用地疏散广场上建设的临时设施，不应影响疏散广场的正常使用；

(2) 建设用地内附建的临时场馆设施不宜对主体建筑外部景观效果产生负面影响；

(3) 临时场馆设施的建设不应影响建设用地内现有的各种管线设施；宜尽量利用规划建设用地内现有的各种管线设施，以减少铺设各种临时管线的费用；

(4) 建设用地内建设的临时场馆设施拆除后，应按建设用地原有总平面规划恢复；

(5) 建设用地内附建的临时场馆设施超出建设用地范围时，还应满足城市总体规划的相关规定。

3. 临建项目的设置应考虑对周边环境的影响

(1) 临时场馆设施的建设应充分考虑该项目对周边市政交通环境可能产生的影响；

(2) 应充分考虑临时场馆设施相应的安全设施设置，减少其可能对周围环境产生的不安全因素；

(3) 应尽量减少临时场馆设施可能产生的噪声而对周边环境带来的影响，必要时应采用临时隔音墙及设置绿化屏障等措施。

三、各类临建设施具体要求

1. 临时看台

(1) 临时看台的建设应满足 2008 年奥运会的要求；

(2) 临时看台的建设优先选用和租用成品工业化及标准化产品；

(3) 临时看台应选用无污染、可回收、重复利用的材料进行建造；

(4) 临时看台优选使用环保材料制作的座椅；

(5) 鼓励临时看台的异地再利用。

2. 临时围挡物

(1) 围挡物的外观设计在满足使用要求的基础上，应注重美观，符合城市景观要求，避免光污染；

(2) 围挡物应选用无污染、可回收、重复利用的材料进行建造；

(3) 围挡物的建设优先选用和租用工业化及标准化产品；

(4) 鼓励利用临时围挡物进行广告宣传；

(5) 鼓励围挡物的异地再利用。

3. 临时房屋

- (1) 临时房屋的建设与设置应根据 2008 年奥运会赛事要求进行设置；
- (2) 临时房屋的建设优先选用和租用工业化及标准化产品；
- (3) 临时房屋应选用无污染、可回收、重复利用的材料进行建造；
- (4) 临时房屋的建设应在建设之初就充分考虑其回收与重复利用方案。

4. 围护结构

- (1) 临建场馆的建筑围护结构设计应确定完善的建筑构件及材料的回收和再利用方案；
- (2) 优先选用和租用工业化及标准化产品；
- (3) 就地取材，优先采用可异地再循环利用的建筑材料；
- (4) 根据北京 8、9 月份的气候条件，针对不同类型的体育场馆建筑功能要求，确定围护结构的热工性能。

5. 卫生间

- (1) 临时场馆应优先考虑利用场馆周边安全区范围内已有的公共卫生间，不足的部分采用临时卫生间；
- (2) 临时厕所应满足国家有关公共厕所的规范要求；
- (3) 临建场馆若具备给水和污水管网，可采用节水型厕所，产生污水排入末端建有污水处理系统的市政污水管网；
- (4) 不具备市政污水管网的临建场馆，临时厕所应选用成品型生态厕所，并具有占地少、能耗低、二次污染小、运行经济、可移动等特点。

6. 洗浴间、洗涤用品

- (1) 临时场馆应优先考虑利用场馆周边安全区范围内已有的洗浴设施，不足的部分采用临时性洗浴设施；
- (2) 临时性洗浴设施的洗浴污水尽量与市政污水管道连接，无法连接时必须设有净化装置，污水经处理达到相应排放标准后方可排入自然水体；
- (3) 洗浴间附近无接纳水体时，应采取措施使其得到回用，同时保证回用水水质达到相应的标准；
- (4) 应积极采取措施，使临时洗浴间的空调冷凝水、洗浴污水得到充分的再利用，建议优先考虑绿地浇灌；
- (5) 洗浴间提供的洗涤用品应为无磷产品；
- (6) 洗浴间提供的洗发液、洗浴液应设计（或置换）成固定容器重复灌装的形式，以减少包装袋（瓶）垃圾的产生量。

7. 建筑材料

- (1) 奥运临建场馆所用材料必须满足现有国家及行业产品质量相应标准；
- (2) 奥运临建场馆禁止使用污染环境、影响人体健康或国家产业限制技术落后的产品，有害物质应满足有害物质限量国家标准要求；
- (3) 奥运临建场馆设施建造前应制定临建材料的再利用方案，保证材料的回收再利用；
- (4) 尽量使用本地原料和劳动力生产的建筑产品（500km 以内）；
- (5) 鼓励使用含工业废渣、建筑废弃物制造的建筑材料；
- (6) 鼓励使用可再利用或可再生的建筑材料如金属材料、木材等。

8. 设备系统

- (1) 设备系统的选用优先考虑可移动的集成式系统；
- (2) 设备系统满足设计要求即可，不需留余量；
- (3) 空调相关设备应该选择具有可移动、易拆卸的设备，如风冷式空调等，必须保证设备的污染物排放量低于国家有关标准；
- (4) 不宜有过多的管道工程，如应尽量就近取得新风、送风采用成品塑料风道系统等；
- (5) 尽量减少设备体系的初投资，可适当放宽能源效率要求，应以使用电能为主；
- (6) 临建的设备方案应考虑技术经济性，优先考虑租用设备的方案，尽量避免购买赛后难以继续利用的设备，如确需购买应提供奥运结束后设备继续使用的具体方案；
- (7) 无特殊标准要求，在满足上述设计原则的基础上，符合国家相关行业标准和要求即可。

9. 临时道路、场地和绿化

- (1) 临时道路及场地的设置应符合场馆、场区总体规划的要求。在充分利用现有市政设施的基础上，尽量避免对场地内现状绿化系统的破坏，尤其应注意对高大乔木的保护；
- (2) 临时道路及场地的建设在满足临时使用功能的基础上，应便于拆除，注意恢复场址原有的地形地貌；
- (3) 鼓励选用或租用成品绿化，通过合理搭配起到美化环境的作用。

Guideline of Environmental Protection for Temporary Olympic Projects

I. Foreword

The Olympic Games is one of the largest and most influential sports competitions in the world. It has various events and large competition venues. Since the Olympic Games last a short period of time, in order to reduce construction fees and alleviate financial burdens, and to meet the needs of post-Games usage and sustainable development, usually a large amount of temporary constructions are established to satisfy the special requirements during the Olympic Games and are dismantled after the Games. These temporary constructions include temporary venues, temporary facilities, and temporary seats, rooms and equipment, which are built to meet the needs of competition events and are dismantled after the Games.

In order to promote the sustainable development of Beijing city and realize the commitment of "Green Olympics", BOCOG and Beijing Science Committee of Olympic Games have organized the research institute concerned to study the major fields related to environmental protection in temporary Olympic constructions. On the basis of the concurrent standards of China and by referring to advanced and feasible international environmental protection standards, the Guideline has been edited, which observes the following directions:

1. The construction of temporary buildings and facilities should adhere to the principle of "Thrifty Olympics", reflect the concept of "Green Olympics" and realize the goal of sustainable development.
2. The construction of temporary buildings and facilities should give priority to adopting or renting industrialized and standardized products, such as finished toilets, finished temporary rooms and finished temporary greening.
3. The construction of temporary buildings and facilities should make no negative influence on the environment.

II. Requirement of planning

1. Venue selection should satisfy general planning of the city

(1) Temporary venue facilities may not be close to dangerous sources (including high-voltage power line, storage of dangerous goods and natural gas station) and polluting sources. If this cannot be ensured, keep a distance regulated in related national standards from these facilities.

(2) Temporary venue facilities may not be built within areas of city ecological conservation and relics preservation. Otherwise, it must be proved that minimum negative influence will be ensured.

(3) Temporary venue facilities separately built should be located in city public land and schemed construction land with convenient traffic conditions and relatively perfect infrastructure.

(4) The construction of temporary venue facilities should firstly choose lands that cost less transformation fees.

(5) Venue selection should fully consider the building's condition against disaster, avoiding the location with high-density buildings.

2. Venue selection should comply with general layout of the construction area

(1) Temporary venue facilities within the construction area should not occupy the passageway of fire protection vehicles inside the schemed area. Temporary facilities built on the evacuation square should not influence the normal usage of the square.

(2) Temporary venue facilities within the construction area should not have negative influence on the outside sight effect of the major buildings.

(3) Construction of temporary venue facilities may not influence the existing pipe facilities within the construction area. Try hard to make full use of the existing pipe facilities within the schemed construction area to reduce the expense of paving various temporary pipes.

(4) After the temporary venue facilities within the construction area are dismantled, recover the construction area to the original layout.

(5) When the temporary venue facilities within the construction area exceed the scope of the construction area, the related regulations of general city planning shall be satisfied.

3. Installation of temporary projects should consider its influence on the surroundings

(1) Construction of temporary venue facilities should fully consider the possible influence on the nearby traffic environment.

(2) Fully consider the safety facilities installation of temporary venue facilities to reduce possible insecure elements on the environment.

(3) Reduce the possible noise influence of temporary venue facilities to the surroundings and adopt soundproof walls and greening barriers if necessary.

III. Specific requirement on various temporary buildings and facilities

1. Temporary stand

(1) Construction of temporary stands should satisfy the needs of 2008 Olympic Games.

(2) Construction of temporary stands should give priority to adopting or renting

industrialized and standardized products.

(3) Construction of temporary stands should use recoverable and recyclable materials, free of pollution.

(4) Construction of temporary stands preferably adopts chairs made of environmentally protective materials.

(5) Reuse of temporary stands in other places is encouraged.

2. Temporary barriers

(1) On the basis of meeting practical needs, the outlook design of barrier should emphasize appearance, complying with city landscape requirement and avoiding light pollution.

(2) The barriers should use recoverable and recyclable materials, free of pollution.

(3) Construction of barriers should give priority to adopting or renting industrialized and standardized products.

(4) It is encouraged to use the temporary barriers for advertisement.

(5) Reuse of barriers in other places is encouraged.

3. Temporary rooms

(1) The construction and arrangement of temporary rooms should follow the requirement of the 2008 Olympic competition events.

(2) Construction of temporary rooms should give priority to adopting or renting industrialized and standardized products.

(3) Temporary rooms should use recoverable and recyclable materials, free of pollution.

(4) At the beginning of construction, temporary rooms should fully consider the arrangement of recovering and reusing.

4. Surrounding structures

(1) Design of surrounding structures of temporary venue construction should follow the program of the accomplished construction components and the recovery and reuse of materials.

(2) Priority should be given to adopting or renting industrialized and standardized products.

(3) Make use of accessible materials and preferably adopt building materials that may be reused in other places.

(4) According to the climate conditions of August and September in Beijing, ascertain the

heat engineering functions following the requirement of different sports venues.

5. Toilets

(1) Preferably make use of the existing public toilets within the security boundary around the venue and adopt temporary toilets if not enough.

(2) Temporary toilets should meet the needs of regulations related to public toilets.

(3) If the temporary venue has water supply and drainage pipe network, water saving toilets may be adopted. Discharge the waste water to city water pipe network whose terminal has a waste water treatment system.

(4) For the temporary venues without city waster water pipe network, temporary toilets should adopt finished ecological toilets, featuring small size, low energy consumption, low secondary pollution, economical operation and mobility.

6. Bathroom and bathing commodities

(1) Preferably make use of the existing bathing facilities within the security boundary around the venue and adopt temporary bathing facilities if not enough.

(2) Waste water should be discharged into the city waste water pipe network. Purifying device is needed if there is no connection available. Water discharged into natural waters must reach the related standards.

(3) If no accepting water is available near the bathroom, measures should be adopted to reclaim it, making sure that reclaimed water quality reaches the related standards.

(4) Positive measures should be taken to fully reuse the AC condensation water and wastewater after taking a bath. Greening watering may be firstly considered to adopt the reused water.

(5) Bathing commodities provided for the bathroom should be free of phosphorus.

(6) Fixed containers may be employed to store body and hair shampoo to reduce trash of bags or bottles.

7. Building materials

(1) Materials used by Olympic temporary venues must satisfy the related existing standards of the nation as well as the trade.

(2) Products polluting the environment, influencing human health or being restricted by national technical standards are forbidden. Harmful materials must meet the needs of national standard related to harmful materials.

(3) Before construction, scheme of reusing the materials should be set up to ensure the

recovering and reusing of materials.

(4) Adopt building products of local materials and local labor (within 500km).

(5) Use of building materials containing industrial waste residue or made of building wastes is encouraged.

(6) Use of recoverable and recyclable building materials such as metals and woods is encouraged.

8. Equipment system

(1) Adoption of equipment system should firstly consider portable integrated systems.

(2) It is all right that the equipment system meets the design requirement and marginal space is not necessary.

(3) Equipment related to AC should choose that movable and easy to dismantle, such as wind-cooling AC. The amount of pollutant discharged must be lower than the related national standards.

(4) Obsessive pipe projects are not appropriate. For example, obtain fresh air nearby as much as possible and adopt finished plastic duct system.

(5) Reduce initial investment of equipment system as much as possible. Lower the requirement on energy efficiency and mainly adopt electric energy.

(6) Equipment scheme of temporary buildings should consider the economy of technology, preferably adopting programs of renting equipment. Avoid purchasing equipment that is not usable afterwards. If purchase is really necessary, provide a specific program of using the equipment after the Olympic Games.

(7) There is no special standard requirement. On the basis of satisfying the above principles, comply with the related national trade standards and requirements.

9. Temporary roads, venues and greening

(1) Installation of temporary roads and venues should follow the requirement of general planning of venues and venue areas. On the basis of making full use of the existing facilities, avoid damaging present greening system inside the venue. Special attention should be given to the protection of tall arbors.

(2) On the basis of meeting the needs of temporary use, construction of temporary roads and venues should be easy to dismantle. Pay attention to recovering to the original terrain appearance of the venue site.

(3) Adopting or renting finished greening is encouraged, reaching the effect of

beautifying environment through reasonable arrangement.