

CONTROL AS AN ELEMENT IN MANAGING THE LANDSCAPE

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## CONTROL AS AN ELEMENT IN MANAGING THE LANDSCAPE

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### Abstract

A landscape control model based around the prompting questions of Who? What? When? Where? Why? How? is developed to provide an insight into the mechanisms of control that can be exerted on landscape projects. The model is used as a basis from which to describe six major areas where control options exist. These are suggested as education, professional practice, management, institutionalized constraints, control of the added bio-physical environment, and manipulation of design components and variables. It is concluded that a wide variety of control options for manipulating the landscape are available to the landscape manager or landscape architect but the complexity, inter-relationship and extent of these controls is rarely understood. It is suggested that the landscape architect with a broad knowledge of these control options is in a position to take full responsibility, at a level equal to any other discipline, in administering development projects in our highly technical and ever expanding society.

### INTRODUCTION

The Oxford dictionary notes that the verb "control" has a number of meanings dating from its English usage (controul) after literal translation from the French (controle) in 1475. These meanings have evolved to include "check or verify", "to reprehend", "to overpower" and, of specific interest in the context of landscape, "to exercise restraint or direction upon the free action of", while the root noun has come to include the means of restraint. The purpose of this paper is to examine some of the specific mechanisms that embody the elements of restraint in managing the landscape and to examine their utilization for that purpose. An important starting place in this examination is to clearly identify the general areas in which control can be exerted in order to provide the preparatory framework for a later discussion of each component.

In general, it may be said that control is exerted in a number of broad areas. These areas may be summarized as:

1. Decisions by people.
2. Fiscal limitations on money and thence indirectly on time.
3. Manipulation of sources, quality and quantity of information.
4. Manipulation of resources in the existing or planned physical environment.
5. Supervision of people.
6. Regulation of ideas.
7. Specificity of methods.

An expansion of these areas and their relationship to each other has been constructed as a simple model using as its core the prompting questions, who, what, when, where, why and how? The model combines implicit and explicit controls, identifies their internal or external nature, links them to a related element - constraints, aggregates like types and illustrates time horizons wherein controls may be exercised. An intrinsic conclusion from the model is clearly that information begets power and power underscores control. Thus information, in the continuum of data-information-knowledge, yields a symbiotic relationship with control.

## DISCUSSION

Since control can be exerted in such a broad range of areas and used in both constructive and negative ways, it is important to examine the underlying reasons for exerting control both over the physical environment and over the social/psychological sub-entity which predecatates all landscape activities. The latter must recognize and reflect the expectations of three classes of people influenced by elements of control and, of course, by the interactions and synergies that derive from the inherent or forced social bond. There are the proponents of the scheme, economic, professional, political and local; there are those for whom the scheme is derived; active, passive or unknowing; and there are those charged with implementation of a project, constrained by the exigencies of time and money. In a more general sense, it can be said that control is exerted to meet, probably in order of priority, (i) the set or modified objectives for the project, (ii) budget limitations including escalation for inflation, (iii) a given timeframe related to project completion, (iv) quantity output in terms of productivity from design stage through to implementation and finally (v) in projects of high profile, above average or advanced quality standards.

Elements of control, though they may be altered in scope and direct applicability, operate in defined segments of a time horizon. This time horizon is initiated at the rising of project conceptualization, carries through the midway point of construction and sets in the afterglow of subsequent maintenance. The time spectrum is segmented only in format but not in substance. The portions intermesh, often causing confusion as extension and iteration of information reclassifies or redefines conclusions. Control becomes more difficult as greater emphasis is placed on disaggregation of the organizational and physical parts of a project with a concomitant loss in holistic comprehension.

Throughout the time/space interface there is the contradiction of stages and interim multiple objectives predicating a unified and integrated finale. Control elements must concentrate and co-ordinate the multiplicity of events through the time spectrum from project conception through project feasibility investigations, planning, site investigation, design, approval, and construction to acceptance, commissioning and eventual maintenance. The complexity of this task has given rise to the various systems of critical path analysis and P.E.R.T. (program evaluation and review technique) which are now widely used for

scheduling work in construction and engineering industries. The systems of network analysis, although simple in principle, are a relatively recent operational research technique, having been developed in the last decade. (Ryan 1967)

Having answered the when and why questions posed by the model, it is important to examine where control can be exerted. There appear to be four distinct elements to these locations that are amenable to control in the landscape context. These elements are: the natural environment, the administrative environment, the direct location internal to a project and the external environment, where direct controls or organizational, political and educational limitations or inertia may impinge upon a project.

The natural environment, simply categorized as air, land, water, fauna, flora, appearance and use, coupled with the bio-physical bonds of ecological interdependence has now been recognized as limited, fragile and, in some cases, non-renewable. Man has exercised control on the natural environment since the discoveries of fire and the plough but it is only in recent times that the ravages of industrialization, overpopulation and excessive consumption have smitten the public awareness. Popular reading such as The Closing Circle (Commoner 1971), The Limits to Growth (Meadows, et al 1972), Ecotactics (Mitchell 1970) followed by the

classics of Hardin (1968), Crowe (1969) and Woodwell (1970) have brought environmental fragility to public attention. Early in the decade Time and Newsweek brought the full impact of environmental limitations to broad public awareness in North America. Newsweek, in "The Ravaged Environment" (1970), noted that an important landscape artifact, "Cleopatra's Needle, the Egyptian Obelisk brought to New York in 1881, has been vastly more worn and scarred by its last 90 years of existence than by its first 3,000" and "for every American, environmental decay has become a personal experience. A glass of water bitter with impurities, a mountain view obscured by haze....". Time opened its article "Fighting to save the earth from man" with a quotation from then President Nixon's State of the Union message "The great question of the 1970's is: Shall we surrender to our surroundings or shall we make our peace with nature and begin to make reparations for the damage we have done to our air, to our land and to our water?" That environment had become a public issue was in no doubt; "the issue now attracts young and old, farmers, city dwellers and suburban housewives, scientists, industrialists and blue collar workers. They know pollution well; it is as close as the water tap, the car-clogged streets and junk-filled landscape. Our country's visible decay, American the Ugly." It was all made more poignant by the technological accomplishment of men on the moon (Aldrin 1970) and the pictures of our small blue world with its white swirling clouds, a finite jewel in a massive universe. The

legal and scientific ramifications from this awareness in the early part of the decade are still with us. The arguments are now more reasoned, scientific information more reliable and controls certainly no less and perhaps more vigorously imposed as expectations, awareness and demands for "quality of life" are inculcated upon politicians and planners.

The abstract "Administrative Environment" outlined in the model is an area important for consideration for it is here that the components which underlie all tasks are evident. It is here that the role and job description, the allocation of responsibilities and instructions on scope come together collectively as the "mandate" for those associated with a landscape project. Moreover, the esprit de corp, morale and pride of workmanship which play such an important part in productivity and quality come together in the administrative atmosphere of motivation. Considerations under the key words of men, money, methods, materials and machines can be portrayed in simple listed form:



MEN

Education  
 Training  
 Qualifications  
 Experience  
 Rank  
 Job title  
 Job description  
 Salary  
 Mobility  
 Aspirations  
 Affiliations  
 Creative freedoms  
 Working conditions  
 Morale

METHODS

Legality  
 Admin. complexity  
 Interpretive simplicity  
 Safety  
 Efficiency  
 Flexibility  
 Alternatives  
 Guidelines  
 Standards  
 Records  
 Presentation  
 Communication

MONEY

Capital avail.  
 Borrowed cost  
 Cost sharing  
 Priority of tasks  
 Budget requirements  
 Benefit costs  
 Expenditure trends  
 Amortization period

MACHINERY

Suitability  
 Proven reliability  
 Safety  
 Cost-capital  
 Cost-operating  
 Depreciation rates  
 Design  
 Maintenance  
 Adaptability  
 Efficiency  
 Availability  
 Utilization

MATERIALS

Hazard  
 Public acceptance  
 Cost  
 Form  
 Dependability  
 Supply  
 Packaging  
 Efficacy  
 Availability

The above may be examined in two crucial dimensions, those of time and of productivity. The element of time is crucial in the context of efficiency and cost while productivity characterizes the skill with which the landscape manager may implement his program off the boards and into the ground while meeting project and client expectations of quality. This concern about productivity ranges from the massive to the specific. In the former case, an example is the Committee on Government Productivity appointed in Ontario in 1969 "To enquire into all

matters pertaining to the management of the Government of Ontario". The Committee set forth as its objectives:

- . To recommend to the Cabinet realistic and practical ways by which the management of government can be made more efficient, effective and responsive.
  
- . The Committee prepared, perhaps not too efficiently, a ten volume report. The Committee did, however, bring forward six recommendations to enhance productivity. It was suggested that the management style of the government in the decade ahead requires:
  - . A decision making process at the ministerial and upper levels of the public service which will facilitate policy and priority setting.
  
  - . Systems to provide continuous evaluation of the efficiency and effectiveness of government programs.
  
  - . An organizational structure which distinguishes between responsibility for policy formulation and planning on the one hand, program delivery on the other.

- . The delegation of authority and commensurate responsibility for decision making on day-to-day matters on lower levels of management within administration agencies.
  
- . The existence of a corporate structure and philosophy within the total organization of the government which will facilitate good communication and co-ordination of effort among the many diverse agencies.
  
- . A program to develop increased managerial capability throughout the service (Cronyn, et al 1973)

At the other end of the spectrum, Pierce (1980) noted that the Omaha Forestry Division in the context of Urban Forestry is "concerned with crew productivity as are all other phases of the green industry". It was noted that they must contend with the high cost of inflation and are faced with the additional burden of spending limitations; "An effective, smooth-running, profitable business can only be achieved when management is aware of every aspect of the firm's operation. In order to attain this awareness, reliable, useful information is necessary." A substantial number of codes to cover maintenance, planting, and nursery operations are used to control information flow, while outward records accumulate summaries and calculate productivity on a work per man-hour basis or work per man-day basis. Monthly

reports indicate a pattern of productivity for a crew over time and allow comparisons between crews. Annual reports help establish standard and measurable goals for management by objectives.

In an internal context the model notes that control may be exerted in these locations where planning and design is undertaken. Here, a general atmosphere will set the tone of office procedure, affect morale, and ensure supervision. The two most crucial elements over which control can be exerted will be (i) drawings and specifications, and (ii) meetings with client, other participating disciplines and the landscape architect. In the former case, clarity of presentation, observance of conventional standards, competency and completeness should characterize the drawn and written components essential to program implementation. In the latter case, informality at meetings can quickly produce circuitous discussion, endless argument and unclear or expedient resolution of problems. In addition, meetings may waste an inordinate amount of time if not properly run. Simple provision of a competent chairman for meetings, an agenda of business, minutes of the meeting, assignment of duties and timeframe, as well as following, at least within reasonable bounds, Robert's Rules of Order (1967) should ensure a controlled, constructive, progressive framework for information discussion and resolution of problems.

Another locational area, using the "construction location" in its broadest context, where control can be and is exerted, either to the benefit or detriment of a particular project, is from the "external" environment. Here, regulatory agencies at the Federal, Provincial and Municipal level may, through their respective legislation, (for example, at the Federal level, the Fisheries Act, at the Provincial level, the Environment and Land Use Act and at the Municipal level, the Municipal Act and attendant By-laws) exert considerable control over the scope, detail and quality of both projects of a scale that can detrimentally affect the landscape (as with resource extraction) or stipulate conditions for projects which add to the landscape, as would be the case for landscape design in the urban setting.

A very real constraint which may affect landscape implementation is the extent to which other disciplines perceive, understand and integrate their requirements into a landscaping program. The holistic abilities of the landscape architect are often subjugated by architects and engineers, with the landscape architect's site planning role being diminished to providing foundation plant material for the architect's building and groundcover for the engineer's services backfill. Perhaps this is the landscape architect's nemesis for being unwilling or unable to, at least in Canada, strike a professional status on a par with the other design disciplines.

This initial discussion now brings us to the mechanisms by which control can be exerted in the landscape context. It is suggested in the model that there are six main categories into which control options may be reasonably assigned. The first of these options is the realm of education. Here, the balance between practical experience and formal education provides the underpinning to the well-rounded professional person. The individual must be willing to mold his or her talents within an educational curriculum and have the benefits of training which comes from exposure to a working office environment. However, it becomes incumbent upon the professional to continue to broaden his or her horizons by attending professional conferences, maintaining new developments in the profession and extending personal knowledge of the constraints and abilities which encumber, or are offered by, other disciplines. It is, though, in the area of formal programs where the benchmarks of professionalism, deductive reasoning, comprehension, and breadth of knowledge are laid down. The guidance of education provides the framework for creative expression in this synergy of experience.

The second category in which control is exerted is through the regulation of professional practice. A typical example is the Landscape Architect's Act in British Columbia (1968). In this name Act the use of the designation "Landscape Architect" is restricted to those in good standing in the Society, which is

accorded special provisions in the Act for examining prospective members and adjudicating their qualifications for membership. This is in contrast with professional practice Acts (such as those for architects and engineers) where both the designation and practice of the respective professions is restricted.

In addition to the direct legal control of professional practice, many professions provide for a Code of Ethics to establish basic criteria for professional conduct. Again, an example here is the British Columbia Society of Landscape Architects, where use of the architect's name, fees, method of contract procurement, and the relationship of the landscape architect to clients and contractors is spelled out. Moreover, the landscape architect's relationship with other disciplines, commentary on other landscape architects, their projects, and ensuring that other landscape architects are not displaced or that the financial or business dealings of the landscape architect provide that only unprejudiced professional services are rendered, are spelled out in some detail.

In the same manner, other professional societies set forward codes of ethics for their membership. For example, the Alberta Society of Professional Biologists stresses four kinds of professional responsibility: general responsibilities; public responsibilities; professional responsibilities; and responsibilities to the employer or client with all of the

statements in the Code of Ethics adopted by the Alberta Society of Professional Biologists pointing towards protection of the public in accordance of the laws of Alberta and Canada (Dabbs 1980).

Even non-professional societies with a strong relationship to the landscape industry have prepared codes of ethics. An example is the International Shade Tree Conference Code of Ethics (1968) which is derived, in part, from the Arboricultural Code of the National Shade Tree Conference adopted in 1946. In the latter, seven points specifically addressed conduct and business ethics ranging from "Complete and extensive care should be given a tree only when the chances of success are good and the benefits to the tree are comensurate with the cost" through the admonition that "The Conference holds that the quality of service should not be reduced below a satisfactory standard because of reduced charges" and "Destructive criticism of the conduct and performance of competitors destroys confidence in the profession and so is contrary to the principles of the ..." to "An Arborist is expected to carry suitable and adequate insurance to enable him to satisfy all just claims for damage resulting from injury to workers, other individuals, or property."

It is interesting to note that a provision which would now be seen as unethical clearly states that "An Arborist should follow fair employment practices in paying and otherwise dealing with



employees. Opportunities should be provided for increasing the knowledge and skill of men interested in making a career of arboriculture." This same emphasis on male arborists carries through the more recent Code of Ethics wherein each of the 14 points of the Code specifically refers to the arborist in the male gender!

The question of business practice and ethics has been a re-occurring topic of interest amongst arborists. In 1955, Pritchard noted "A new sense of obligation has been added to old ideas of personal goodness". It was noted that the word "ethics" comes from the Greek word meaning "custom", and that it differs from morals which are mainly negative in that ethics are considered as chiefly positive, indicating what ought to be done under certain circumstances. It is also noted that ethics take "notice of the past, the desires of other people and the consequences of actions, those obviously right, and those obviously wrong as well as those of justice and lawfulness. Ethics is a two-way highway with equity as its foundation". Perin (1961) noted that there are a number of unethical practices of some arborists that required policing and remedy. These were suggested as:

1. The submission to high pressuring clients.
2. Discrimination of other companies.

3. Misrepresentation of a firm.
4. Commercial arborists who fail to follow recommendations of products.
5. Failure to clarify a client's diagnosis.
6. Overcharging a client.
7. Failure to follow up the recommendations of Universities.

Willson (1962), in addition to providing the intriguing definition of management "Management is simply trying to get a very important job done with the help of other people", he notes that ethics also extend to the treatment of employees. It is suggested that the best manager is fair, patient, thoughtful, courteous, tactful and pleasant and that attitude, self-control and ethics go hand-in-hand.

It is not always clear that the essential constructs of ethical behaviour can be readily enunciated. Cripps (1978) noted in chairing a review session of the B. C. Society of Landscape Architects that "A major impact on the group studying professional ethics was the unanimous concensus that there did not exist a clear understanding of the word ethics, nor was it clear as to what the B.C.S.L.A. was aiming to achieve by establishing a Code of Ethics with the questions 'What are Ethics? What constitutes ethical behaviour and what are acceptable ethical standards?', going unanswered."

Control of all aspects of landscape development as suggested in the model can be exerted through management techniques. In addition to management techniques, of course, there are elements of management which directly influence the exercise of power and control. Position in a hierarchy, level of participation, the level at which decisions are made, access to information and management style can have far reaching implications in "exercising restraint or direction upon the free action of" (from the definition of the verb to "control").

One of the key elements in applying management control is in the prescription of Terms of Reference for a project wherein the scope and goals or objectives of a project are set out. Here the limitations of understanding on the part of a proponent or client may unrealistically constrain the investigation and solution of particular landscape problems.

In addition to the influence of politics and the area of jurisdiction or responsibilities, commonly referred to as "powers" there is the area of general and explicit policies. Recognition of the importance of landscape values is now becoming increasingly apparent, particularly as a result of criticism directed toward resource development companies. Since such criticism touches on corporate image, many large companies have endeavored to recognize the environmental implications of their operations. An example

can be seen in the Crown Zellerbach (1973) Environmental Guide for Wood Supply Operations. Here the Corporation's Environmental Policy is explicitly stated:

"Crown Zellerbach recognizes there are other natural resources on forest land in addition to timber and that these resources are interdependent... Crown Zellerbach recognizes the need for more protection of these resources during the timber harvesting process. Crown Zellerbach also recognizes that public attitudes toward the company are influenced by public access to company managed forest lands for recreation, and the appearance of those forest lands. In harvesting logs from the forest under its long term management, the company will strive to maintain a favourable environment by conducting its operations in a manner which will cause a minimum of environmental change. Crown Zellerbach will plan and conduct its timber harvesting operations with consideration for all forest land resources and aesthetic values."

The model suggests that procedures and practices can play a large part in implementing management controls. Procedures can be readily subdivided into six main categories: planning, finance, procedural systems, procedural records, communications and resource stewardship. Formal planning is a fundamental necessity in the management of renewable resources while financial management such as source of funds, budgets and accounting procedures are obviously of importance. In more recent years, the actual benefit/cost of programs has become an issue in justifying particular projects (Goldman 1967, and Organization for Economic Co-operation and Development, 1972). Procedural systems embody the most important component of organizational conduct required to shape the management of landscape programs. These procedures include the operational principles that assign responsibilities, decision making powers, obligations, liabilities, supervision and evaluations which relate to personnel as well as the system logistics which relate to priorities, scheduling, timing, supply, workload analysis and support services.

The major areas in which records are essential include base data on the existing landscape resources, cost breakdowns by individual task, location and quantity, work programmed and completed, safety and similar records.

In the area of communication there are basically three main parts: intradepartmental, interdepartmental and community relations. Vardaman and Vardaman (1973) in their text Communication in Modern Organizations developed the concept of PRIDE as a practical systematic pattern for use in all organizational communications. The acronym provides the essential elements for skillful planning and carrying out of written and oral communications using the key words:

Purpose

Receiver

Impact

Design

Execution

Stewardship of the landscape resource can basically be distilled to three main parts: design, assessment and overall management. While the questions of assessment and management are dealt with here, the element of design is discussed later in this paper under manipulation of design components and variables.

The question of practices is of fundamental importance is considering control mechanisms since field practice is at the end of the long chain of concepts, policies, procedures, and controls which govern any landscape program. Field practice then, is the crucial step that implements the goals and objectives of any

program. The success with which these expectations can be made is predecated on the quantity and quality of work for each task that comprises the landscape program.

The complexity of establishing management controls in our increasingly sophisticated endeavors has been the subject of many recent works and development of systematic approaches. Ghiselli (1971) notes that as organizations or projects grow in scope and complexity "it is the very nature of the case that their integrative and co-ordinative functions assume a greater and greater significance. It seems to be true that for a given proportional increase in the size of a problem it is necessary there be an even greater proportional increase of that part of the management structure which is concerned with its government through executive and administrative actions".

Management by objectives, for example, has been in vogue since the publication of a book of that title by Odiorne (1965). In this systematic approach to management control the major premises of management by objectives are stated as:

1. Management takes place within an economic system that provides the environmental situation for an individual firm or project. This environment, which has changed rapidly over the past 30 years, imposes new requirements on individual managers.

2. Management by objectives is a way of managing aimed at meeting these new requirements. It presumes the first step in management is to identify, by one means or another, the goals of the organization, while other management methods follow this preliminary step.
3. Once organizational goals have been identified, orderly procedures for distributing responsibilities among individual managers are set up in such a way that their combined efforts are directed towards achieving these goals.
4. Management by objectives assumes that managerial behavior is more important than manager personality, and that this behaviour should be defined in terms of results measured against established goals, rather than in terms of common goals for all managers, or common methods of managing.
5. It also presumes that while participation is highly desirable in goals setting and decision making, its principal merit lies in its social and political values other than in its effect from production. Even here it may be a favourable impact.



6. It regards the successful manager as a manager of situations, most of which are best defined by identifying the purpose of the project or organization and the managerial behaviour best calculated to achieve that purpose. This means there is no one best pattern of management, since all management behaviour is discriminatory being related to specific goals and shaped by the larger economic system within which it operates.

The question of managerial style is well discussed by Blake and Mutton (1971) in their book, The Managerial Grid. In this publication a broad range of management scenarios and management styles are depicted, particularly as it relates to leadership. Massie (1971), writing on the essentials of management suggests seven functions used to describe the job of management.

1. Decision Making - the process by which a course of action is consciously chosen from available alternatives for the purpose of achieving a designed result.
2. Organizing - the process by which the structure and allocation of jobs is determined.
3. Staffing - the process by which manager's select, train, promote and retire subordinates.

4. Planning - the process by which a manager anticipates the future and discovers alternative courses of action open to him.
5. Controlling - the process that measures current performance and guides it towards some predetermined goal.
6. Communicating - the process by which ideas are transmitted to others for the purpose of effecting a desired result.
7. Directing - the process by which some actual performance of subordinates is guided towards a common goal".

Finally, there are two important components of management that manifestly affect direct control. The first is that of supervision where, as Ghiselli has noted, "The life and vigor of a business or enterprise lies in the individuals who people it. Unless they work together smoothly and according to a well-worked plan, the organization cannot function properly. However, to work with each other in a co-ordinated fashion the members of an organization need to know what it is there to do, and what the plan is.....it is the function of supervisors to provide this guidance and direction".

Supervision is an essential ingredient in ensuring that the "why" component of the landscape control model is implemented. In order to ensure management's success there is a clear requirement that, at all levels of management, unambiguous and accurate information is available. Many have seen the Verbal Communications Demonstration wherein two people leave the room and a third person is told before an assembled group a particular scenario. This member then leaves the room and in private tells it to a second person who in turn privately tells it to a third person who then re-enters the room, only to describe an entirely different scenario. No longer is verbal communication a sufficiently efficient tool to manage large projects. Consequently, automated data and information processing systems are now becoming increasingly important. As Clarke (1970) correctly observes, "the highly skilled information-processing person has become an increasingly essential part of the forward edge of industrial, scientific, professional, military and managements groups that shape our national life". The complexities of information-processing systems are well described by Awad (1976) in his reeviw of business and scientific information processing; the data processing cycle, input preparation and entry, classifying recorded data, control and stored programs, system analysis and procedure, file organization techniques and information processing methods are all discussed. Moreover, the increasing sophistication of word processing capability within

even small offices radically changes the economics and efficiency of information handling, to say nothing of editing and formatting. The problem, however, lies in propensities for information overload and the difficulties in ensuring information control through limitations on information distribution and rigorous criteria for information classification.

In addition to direct management techniques, a number of institutionalized controls coupled with, or at the mercy of, certain constraints supplement, exemplify, or are appended to management systems. These are shown briefly in the model. Institutionalized Constraints can be drawn to, or act as, explicit controls on landscape projects. Standards, guidelines and rules rank foremost in this section of the model. The inflexibility of standards has long been the bane of designers. However, standards often play the role of providing the lowest common denominator in urban development with opportunities for flexibility occurring in such mechanisms as land use contracts. A classic example of standards are those prepared by Chiara and Koppelman (1978) for site planning. This text draws together a wide body of information in reference form for the planner and landscape architect. Landscape elements are explicitly discussed ranging from space articulators to bio-engineering recommendations for disturbed land restoration with plant material.

Guidelines, though more flexible than standards, may also play an important part in articulating overall policy and providing guidance as to regulatory agency expectations in landscape development. Such is the case with the town planning guidelines published by the Department of Public Works in Canada (1973). This publication and its more detailed accompanying volume on landscape and site development (Schwilgin 1972) provide a clear indication of government expectations for landscape projects funded through the Federal Government. The latter volume discusses in detail site analysis, site requirements, plant material, planting, grading, landscape documents, requirements for topsoil and fertilizer, the construction of lawns and maintenance of landscaped areas.

At the regional scale a number of assessment rules have been prepared to give guidance to the planner or landscape architect concerned with projects of a larger nature. Such is the case with linear corridors and an example in this area are the seven rules prepared by Sir William Holford (a distinguished member of the British Society of Landscape Architects) who has provided detailed recommendations (1973) to the Central Electricity Generating Board as well as the North and South of Scotland Electricity Boards. In the selection of transmission line routes and the siting of substations the following have been recommended:

1. Avoid all together, if possible, the major areas of highest amenity value by so planning the general route of the line in the first place, even if the total mileage is somewhat increased in consequence;
2. Avoid smaller areas of high amenity value, or scientific interest, by deviation, providing this can be done without using too many angle towers, i.e., the more massive structures which are used when lines change direction;
3. Other things being equal, choose the most direct line, with no sharp changes of direction and thus fewer angle towers;
4. Choose tree and hill backgrounds in preference to sky backgrounds wherever possible; and when the line has to cross a ridge, secure this opaque background as long as possible and cross obliquely when a dip in the ridge provides an opportunity. When it does not cross directly, preferably pass between belts of trees;
5. Prefer moderately open valleys with woods, where the apparent height of towers will be reduced, and views of the lines will be broken by trees;

6. In country that is flat and sparsely planted, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles, and other masts, wires and cables, so as to avoid a concentration or 'wirescape';
  
7. Approach urban areas through industrial zones, where they exist, and when pleasant residential and recreational land intervenes between the approach lines and a substation, go carefully into the comparative costs of undergrounding for lines other than those of the highest voltage.

In addition to standards, guidelines and rules a number of other factors can be, or are used as, controls and constraints on landscape activities. The most notable amongst these are legal requirements, plans, and overall standardization. In a clear category by itself are the limitations imposed by the adoption of specific methods as in the case of landscape analysis. The actual execution of landscape operations are also controlled, but in this case by specific document. Examples are tenders, contract documents, specifications, approved lists of appropriate companies (as might be the case with approved landscape contractors) as well as field assessment and inspection of work in progress.

Protection of the landscape under the law is, when compared with the United Kingdom, rather poorly defined in North America. For the most part, the United States and Canada rely upon environmental impact assessment techniques to identify the effect projects have on the natural environment. However, these assessments are normally only used for large projects and make no provisions for the multitude of small projects which may have accumulative effect the removal individual trees, or development of small natural areas dispersed with urban clusters. (Swaigen and Estrin 1978) Moreover, the emphasis in the legislative requirements for determining environmental intrusion, even under the United States National Environmental Policy Act, is on assessment rather than on remedies (Ruckelshaus 1972).

Claus (1971) has noted that formal planning plays an important part in setting social, aesthetic, economic and public safety goals in the urban setting. "In an environment in which no standard of beauty can be universally agreed upon, conflicts are inevitable. For this reason it is necessary to systematize the decision making process which determines urban land use. This formalization has taken the form of explicit city planning procedures implemented by established government units. Three major steps in the decision making process for systematic land use controls are:



1. Goal setting
2. Master planning
3. Operationalization of the plan through By-law enforcement"

In a broader context general operating plans also play an important part in controlling landscape activities. An example is the plan of operations (Anon. 1966) prepared by the United Kingdom Forestry Commission where landscape appearance is specifically assessed in the context of logging operations and a "plan of operations consisting of a map of the land and plantations involved, a description of statement indicating their present conditions, proposals for planting, thinning, and felling in each of the next two 5 year periods, thus details how and in what order of priority this work will be done".

Standardization is worthy of a brief mention. It is becoming increasingly important "in our complex, highly industrialized world as a force toward the simplification of production procedures and everyday life. Standardization also creates meaningful communication between the designer, the producer, and the consumer." (Carriere 1978) The Standards Council of Canada was set up in 1970 with the underlying purpose of acting as a national co-ordinating body through which accredited organizations could co-operate to recognize, establish and improve standards in Canada. The Council works closely with the Canadian Standards

Association, the Canadian Government Specifications Board and the Underwriter's Laboratories of Canada. In addition, the Council represents Canada on the International Organization for Standardization (ISO). Of specific interest to the Landscape Architect is the Standing Advisory Committee on conversion to metric standards and, of course, the revised Canadian Nursery Standards.

The preparation of specifications is a long and tedious business if undertaken from scratch. However, the landscape architect is fortunate in being able to turn to a number of sources for ready-made specifications. An eminent example is Spon's Landscape Handbook of Specifications and Prices (Lovejoy 1972). However, the blind conformity to prepublished specifications may well ignore individual site and design requirements and so must be applied with caution and insight.

An extremely important and fast developing area of landscape architecture is that of landscape resource analysis. Here, many new methods have been developed and published in recent years. Steinitz (1970) in examining the state of the art noted "we frankly feel that the field of landscape resource analysis is wide open and that combination of an increasing public awareness, an input of more and new talent, and a revolution in data handling will surely lead to new ideas and methods". That many have rushed in

is well illustrated by the recent proceedings of Our National landscape a conference on applied techniques for analysis and management of the visual resource. (Elsner and Smardon 1979), where some 94 highly technical papers presented varying techniques for landscape assessment.

In addition to the formalized constraints a number of other controlling factors must be recognized. Perhaps the most important amongst these is the difference in client perception and ability to pay; this often results in substantial underfunding of projects with a significant impact on the landscape or more often, landscaping is perceived as more amenable to cost cutting than would be the hard architecture. History, and the glacial pace of administrative change, as well as expediency, individual emotions, ignorance, and human limitations in perceiving the holistic view must also be recognized as controlling influences.

Lack of clarity and goals is a factor rarely recognized as being of major significance in some projects, the diffuse objectives resulting in poorly conceived designs and implementations. A common element in the landscape which suffers from this problem is that of circulation.

Finally, in this section, it is worth recognizing both supply and bio-physical limitations. Supply of services and materials whether interrupted or unavailable may, severely limit the options available to the landscape architect despite creative designs. In addition, terrain or plant material limitations of the site, coupled with cost barriers may also limit opportunities.

The model identifies added bio-physical environment at an area in which control can be applied. Plant and construction material, spacial relationships, grades and existing resource improvements may all be manipulated to modify or improve a site. Since the options for choice are myriad, a number of references have been developed in order to assist the landscape architect in narrowing down the alternatives and arriving at appropriate choices. Prime examples of these well-used references are Landphar-Klatt's monumental work on landscape architecture construction (1979) where construction material and techniques are exhaustively reviewed. Zion (1979) has provided for the American landscape architect a detailed reference for choice of trees. (Trees for Architecture and the Landscape). Unfortunately, many of the tree species native to Canada, and in some cases native to the United States, as well as trees hardy under Northern Canadian climatic limitations are not included in the book, limiting its usefulness to the Canadian landscape architect.

Manipulation of ground contours has long been an important facet of landscape development. Perhaps the most widely used reference, at least in an educational sense, has been Untermann's Introductory Course in the Principles and Practices of Creating and Drainage, often referred to as grade easy (1973). In this publication the controls of grades and gradients, as well as drainage, is simply portrayed.

An element of control often forgotten, perhaps more so by the developer and planner than by the landscape architect, is integration of the existing bio-physical resource with the added bio-physical resource as well as the modes in which the existing resource can be treated. Management alternatives for the existing landscape fall into seven categories. These may be simply classed as deterioration, destruction, preservation, enhancement, retention, modification and rehabilitation. Landscape deterioration occurs when the landscape architect's activities lessen the visual qualities of the landscape. Landscape destruction occurs when activities abruptly alter the landscape with little regard for landscape values or alternative and integrated future land uses.

While landscape destruction normally occurs rapidly and totally, landscape deterioration is less readily perceived and usually proceeds slowly and fragmentarily. Landscape preservation, as the

name implies, is "management of the visual resource to keep its parts intact and untrammelled by man." (Litton 1970). Landscape enhancement should be the management of the land so as to add visual interest through alterations to complement the characteristic landscape; while landscape retention should be management of the land so as to subordinate management activities to the characteristic landscape. Activities here should be subtly integrated into the landscape so they attract little attention to themselves. Landscape modification normally occurs when management activities are visually stronger than the surrounding characteristic landscape. Such activities are usually noticeable because they are of a different scale or more numerous than natural occurrences of a similar kind. Finally, landscape rehabilitation should be the management of the land so as to reverse or minimize the detrimental visual effect caused by landscape deterioration or destruction.

Manipulation of these seven components allows the landscape architect conceptual control over his activities in the landscape spectrum. Applied judiciously, all have a place. It is incumbent on the landscape architect, however, to ensure that his presence and perceptions can be integrated into the design and development process before any critical decisions concerning site modification have crystalized.

Landscape architecture is, first and foremost, a creative endeavor. The landscape architect is able, as the model notes, to manipulate a wide palate of design components and variables. It is here, finally, that the landscape architect may draw fully upon his skills to "integrate a project in harmony with its total site" (Simonds 1961). As Simonds also notes, (1978) "Our living landscape is composed of ways and places." It is here that the landscape architect manipulates the design components noted in the model in order to divide spaces aesthetically, integrate spaces, integrate masses and balance masses for stability or movement. Moreover, the landscape architect may determine the proportions of space and mass to ensure attractive forms and determine scale relationships between people and the landscape composition. By manipulation of the elements the landscape architect is able to create harmonious composition in terms of colour, texture and form yet introduce contrast to excite the observer or accentuate a point.

Insightful design "presumes a unity of man and nature developed empirically by few landscape architects.... The precursory understanding of natural processes that underlie [this understanding] is limited.... The ecological view requires that we look upon the world, listen and learn. The place, creatures and man, were, have been, are now in the process of becoming. We

and they are here now, co-tenants of the phenomenal world, united in its origins and destiny." McHarg (1969). We can control the world as we better understand it. As we better understand it we clearly find the necessity to be a part of it. Above all we must be sensitive to the world in which we live. We must use our understanding of design with perceptiveness and empathy and our realization of power and control for the benefit of mankind.

#### CONCLUSIONS

In summary it is perhaps useful to reflect on the actual framework in which control can be exerted in any program that manages elements in the landscape. Since the definition for management includes "to have effective control of" and "to conduct the work of" components must be placed in a managerial context that is predecated on an orderly, predictable, systematic structure that has checks and balances, criteria and standards. The administrative framework must ensure sufficient administrative flexibility to allow innovation, natural ability, deligence and descretion to ensure that the system functions smoothly and progressively. No management system of control must work so as to stifle the enthusiasm of individual workers or negate the basic aims of the enterprise. It must ensure that the landscape resource is established, developed, enhanced or replaced so as to provide the maximum yield of benefits, botanically and socially, for the level of effort and funds invested.



LANDSCAPE CONTROL MODEL

LANDSCAPE MANAGER

WHO

WHAT

WHEN

WHERE

WHY

HOW

CONTROL OPTIONS

Control

Project Conceptualization  
Project Investigation & Planning  
Design  
Construction  
Commissioning  
Maintenance

Meet Objectives  
Meet Time Frame  
Meet Budget  
Meet Quality Standards  
Meet Quantity Output

Exerted on

Natural Environment  
+ Mandates  
Motivation  
Men  
Money  
Methods  
Materials  
Machines  
+ Time  
Productivity

Air  
Land  
Water  
Fauna  
Flora  
Appearance  
Use

Constraints

Fragility  
Non-renewability  
Limits

Internal

External

Design Location  
External Constraints  
General Atmosphere  
Drawings  
Site  
Off Site  
Meetings

Agencies  
Regulations  
Other Disciplines

Education

Professional Practice

Management

Institutionalized Constraints

Added Bio-physical Environment

Manipulation of Design Components and Variables

Practical

Theoretical

Code of Ethics  
Regulation  
Law

Power/Position  
Information access  
Decision making level  
Management style  
Scope and goals  
Terms of Reference  
Politics  
Policy  
Powers  
Procedure  
Practices  
Info handling systems  
Supervision

Standards  
Guidelines  
Rules  
Standardization  
Law  
Method Analysis  
Tenders  
Approved Lists  
Field Assess./  
Inspection

Other Constraints and Impediments

Underfunding  
History  
Pxpediency  
Emotions  
Ignorance  
Lack of Clarity in Goals  
Human Limitations  
Supply Limitations  
Bio-Physical Limitations

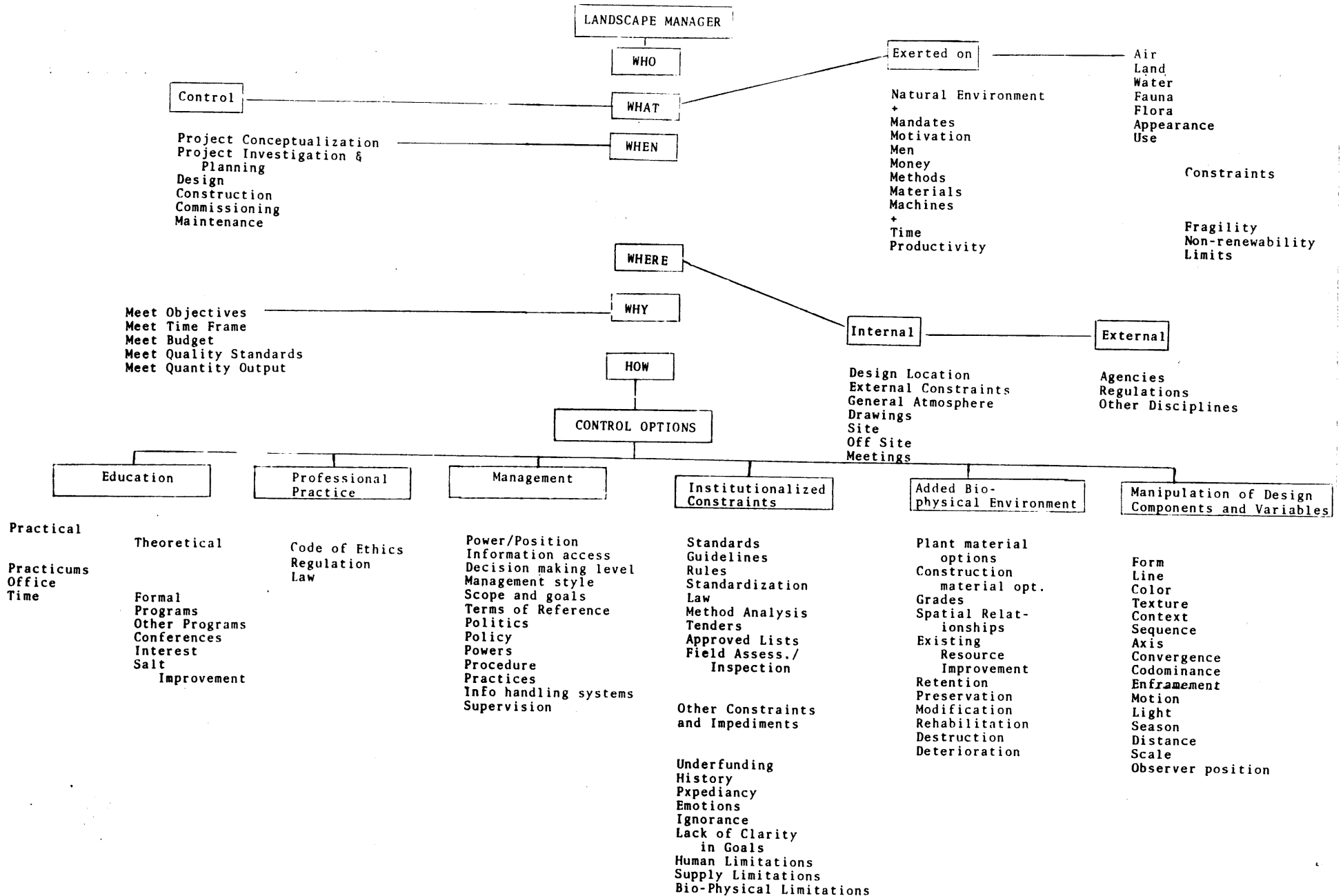
Plant material options  
Construction material opt.  
Grades  
Spatial Relationships  
Existing Resource Improvement  
Retention  
Preservation  
Modification  
Rehabilitation  
Destruction  
Deterioration

Form  
Line  
Color  
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Sequence  
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Convergence  
Codominance  
Enframent  
Motion  
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Season  
Distance  
Scale  
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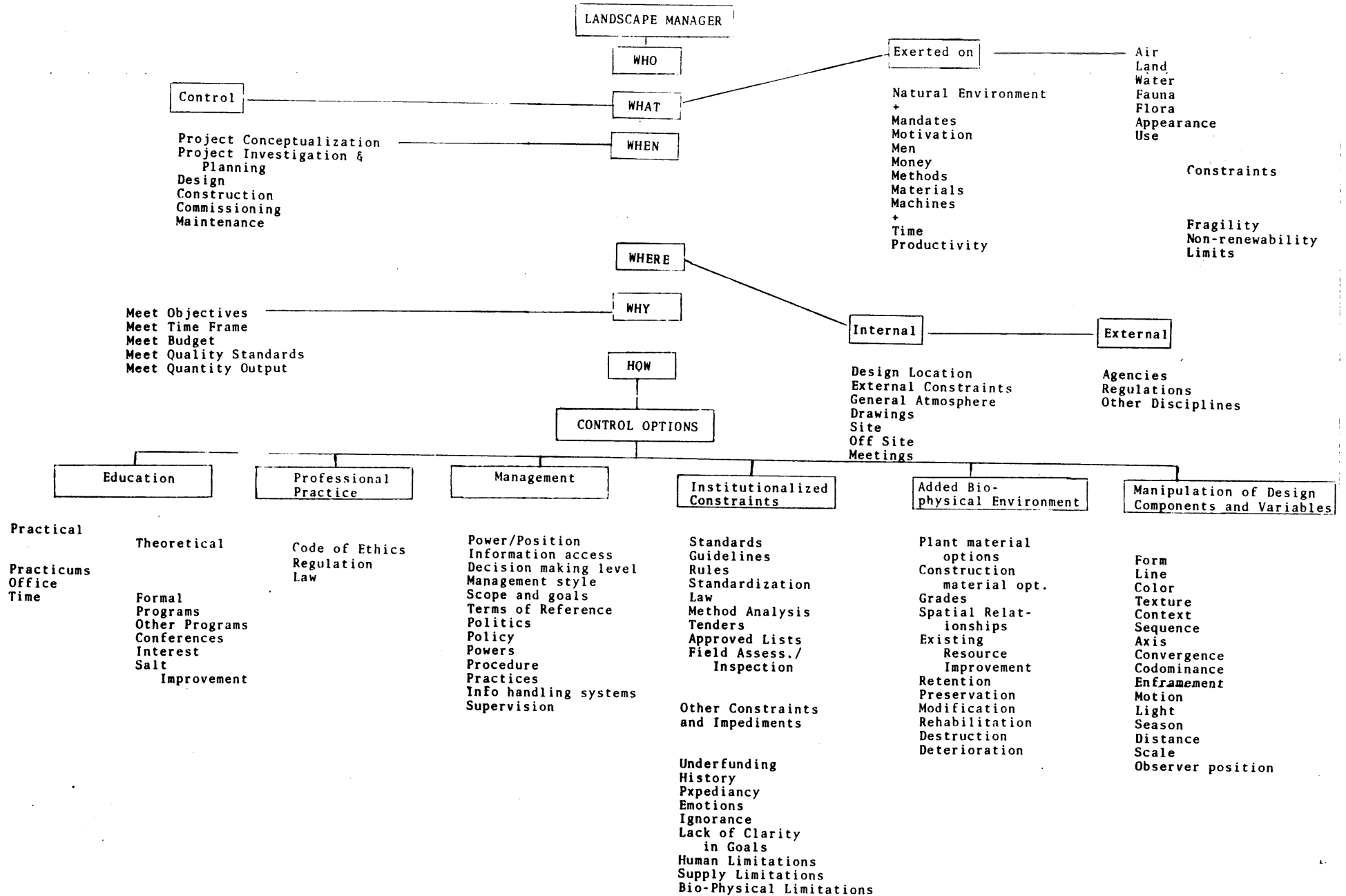
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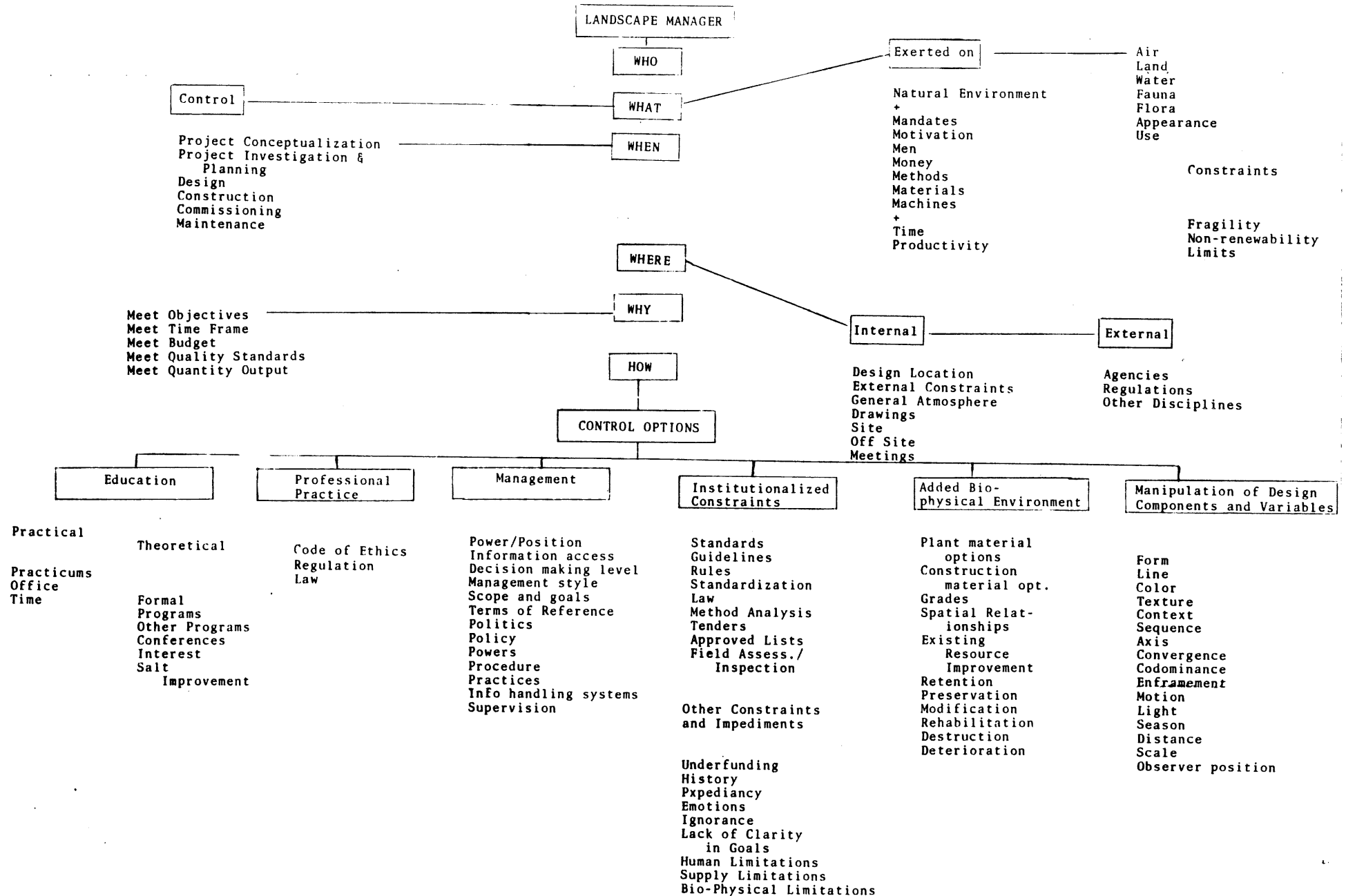
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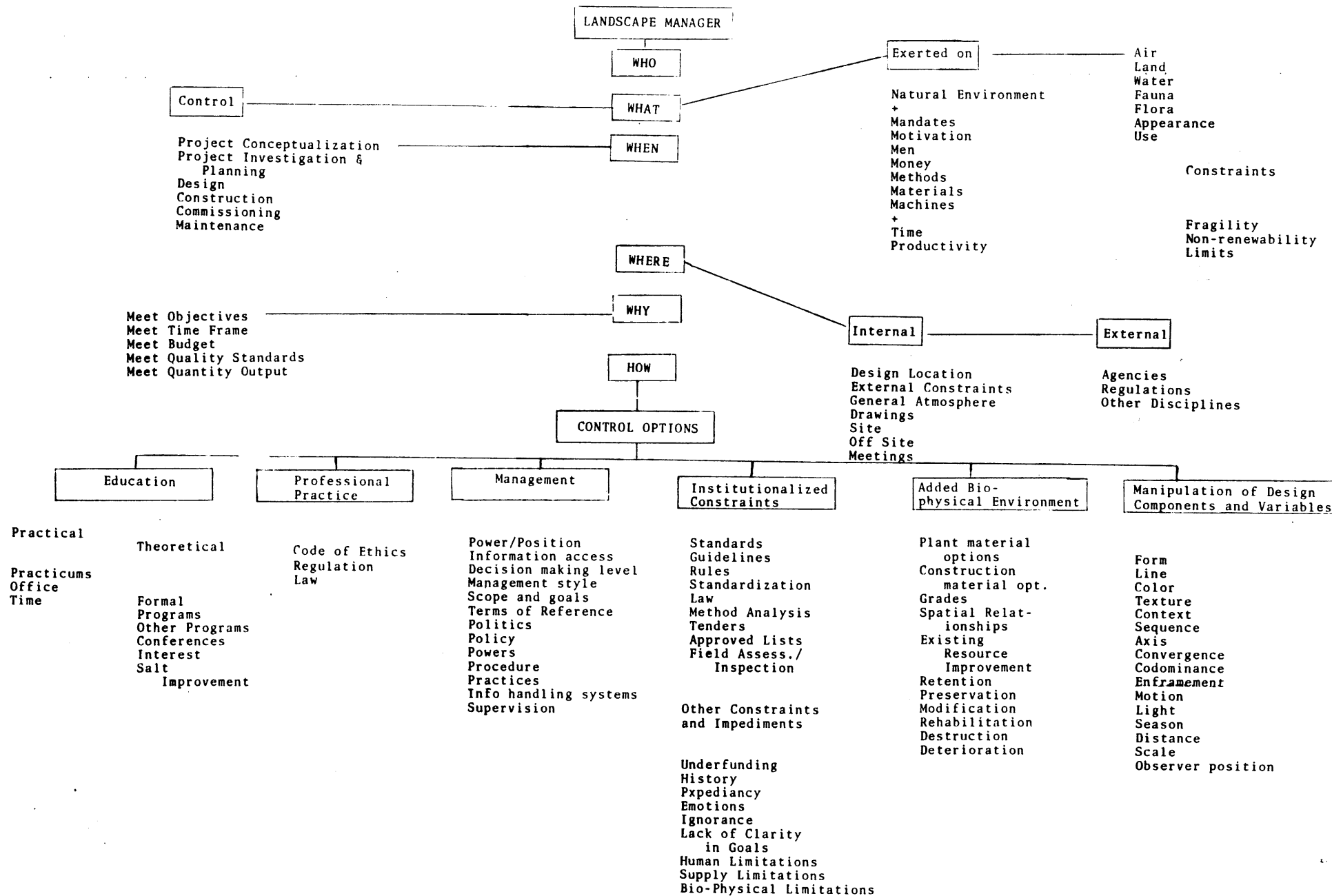
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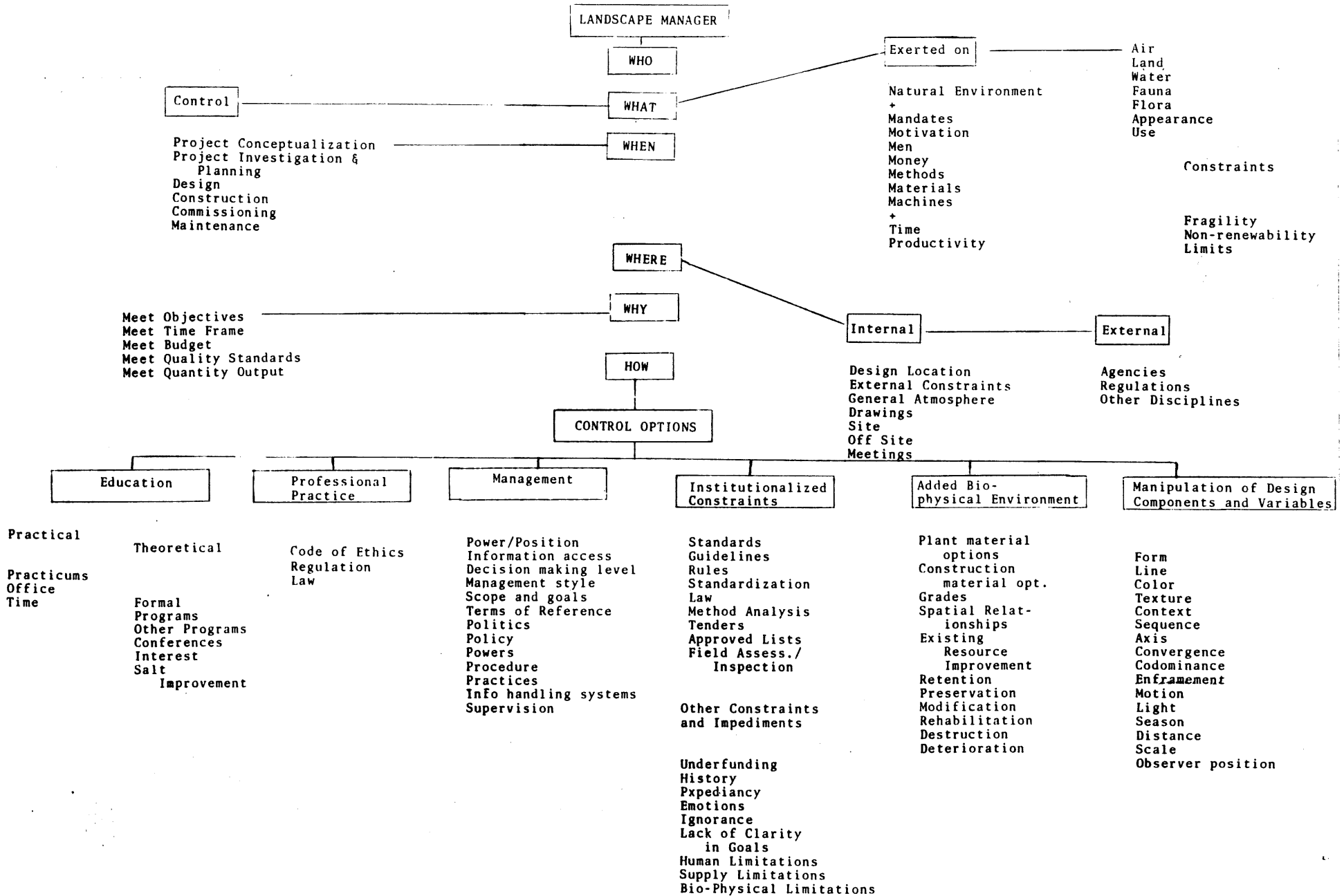
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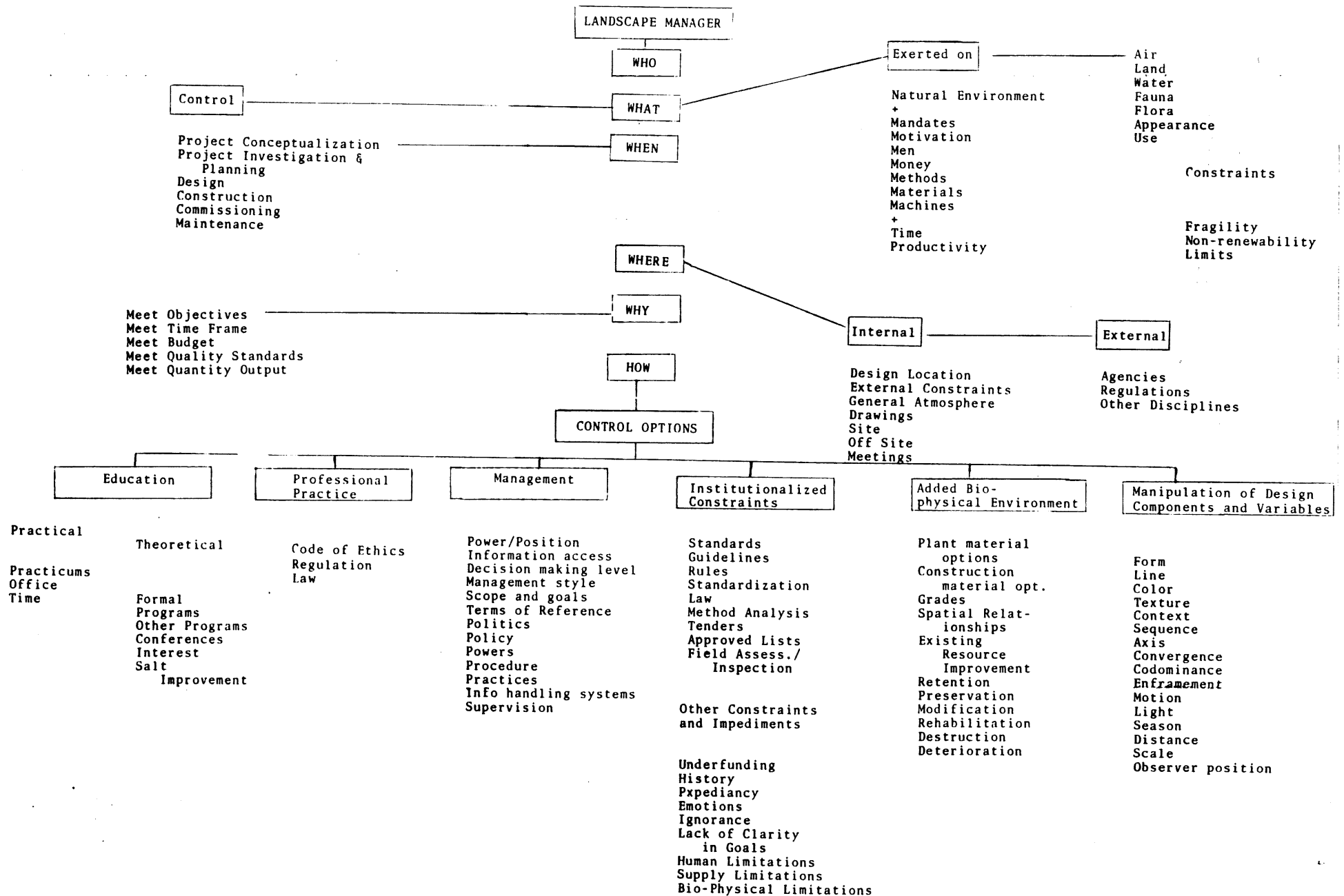
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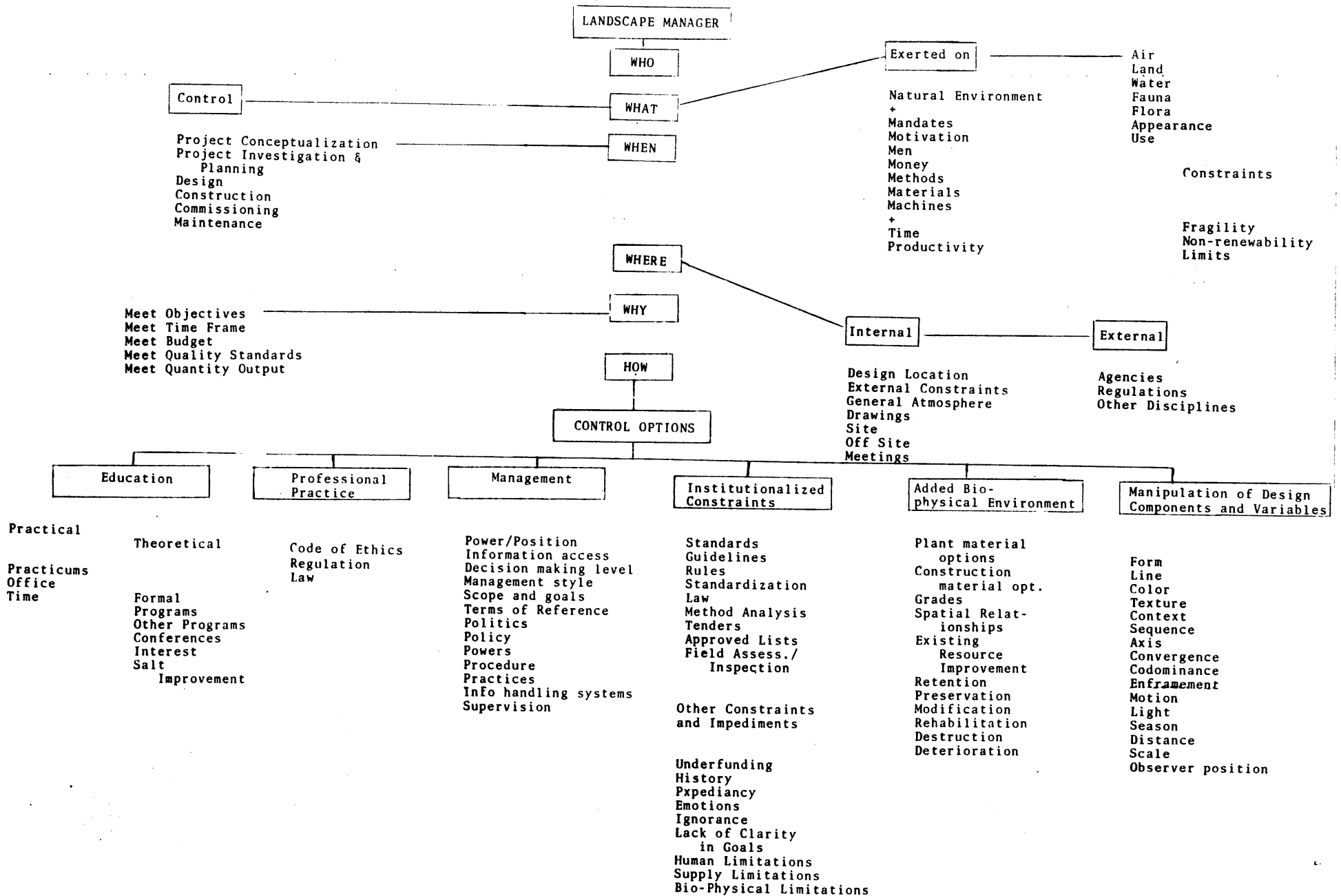
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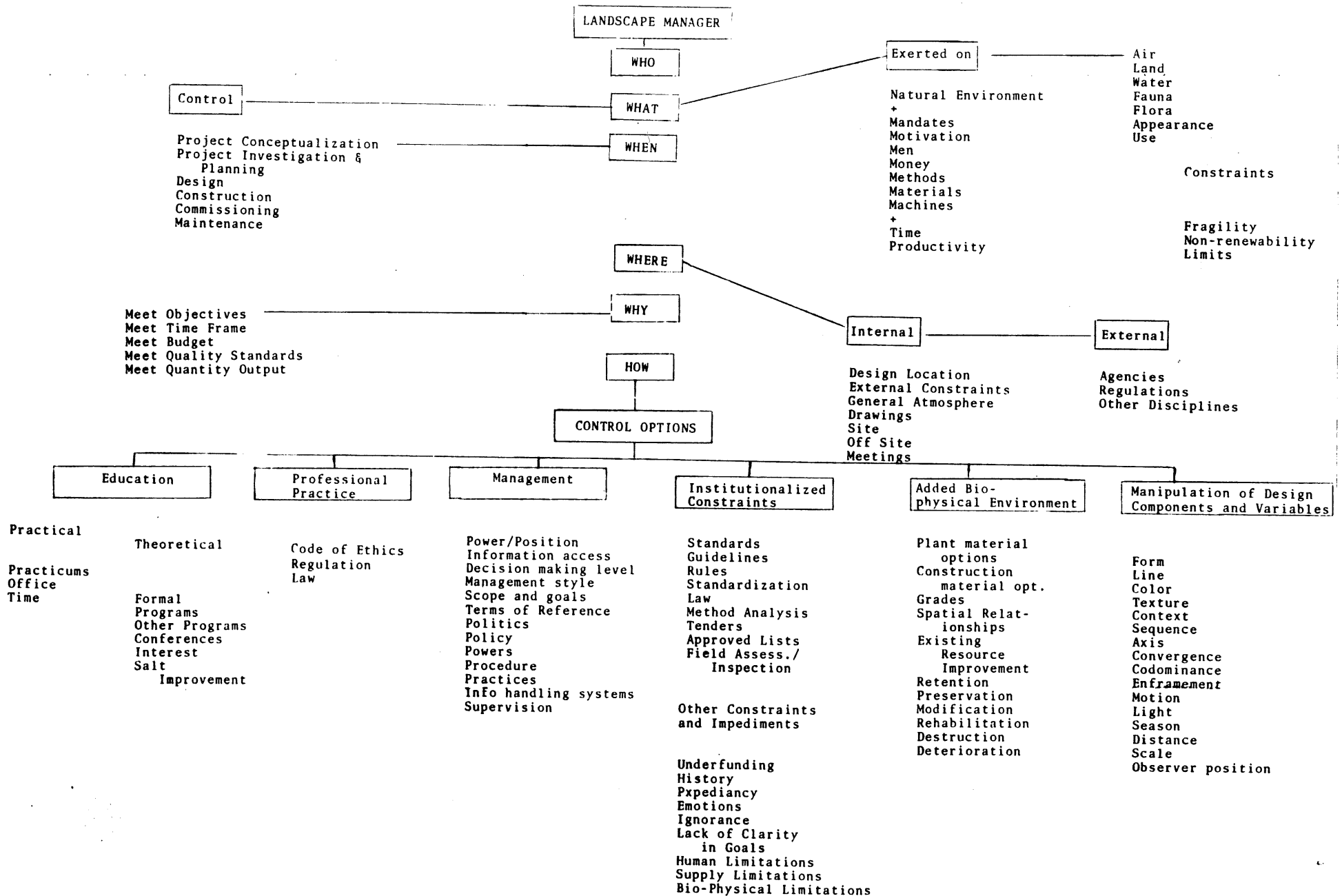


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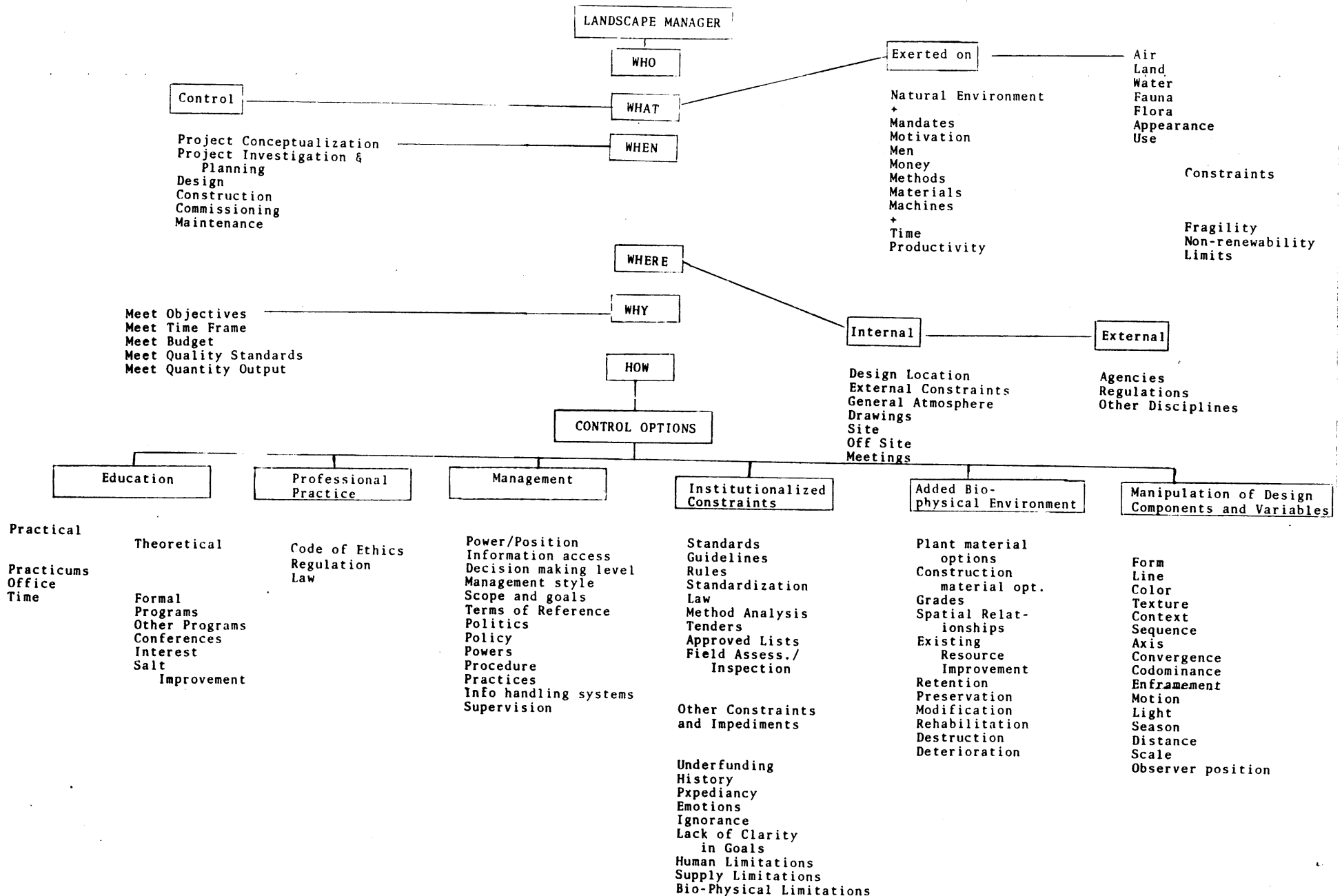




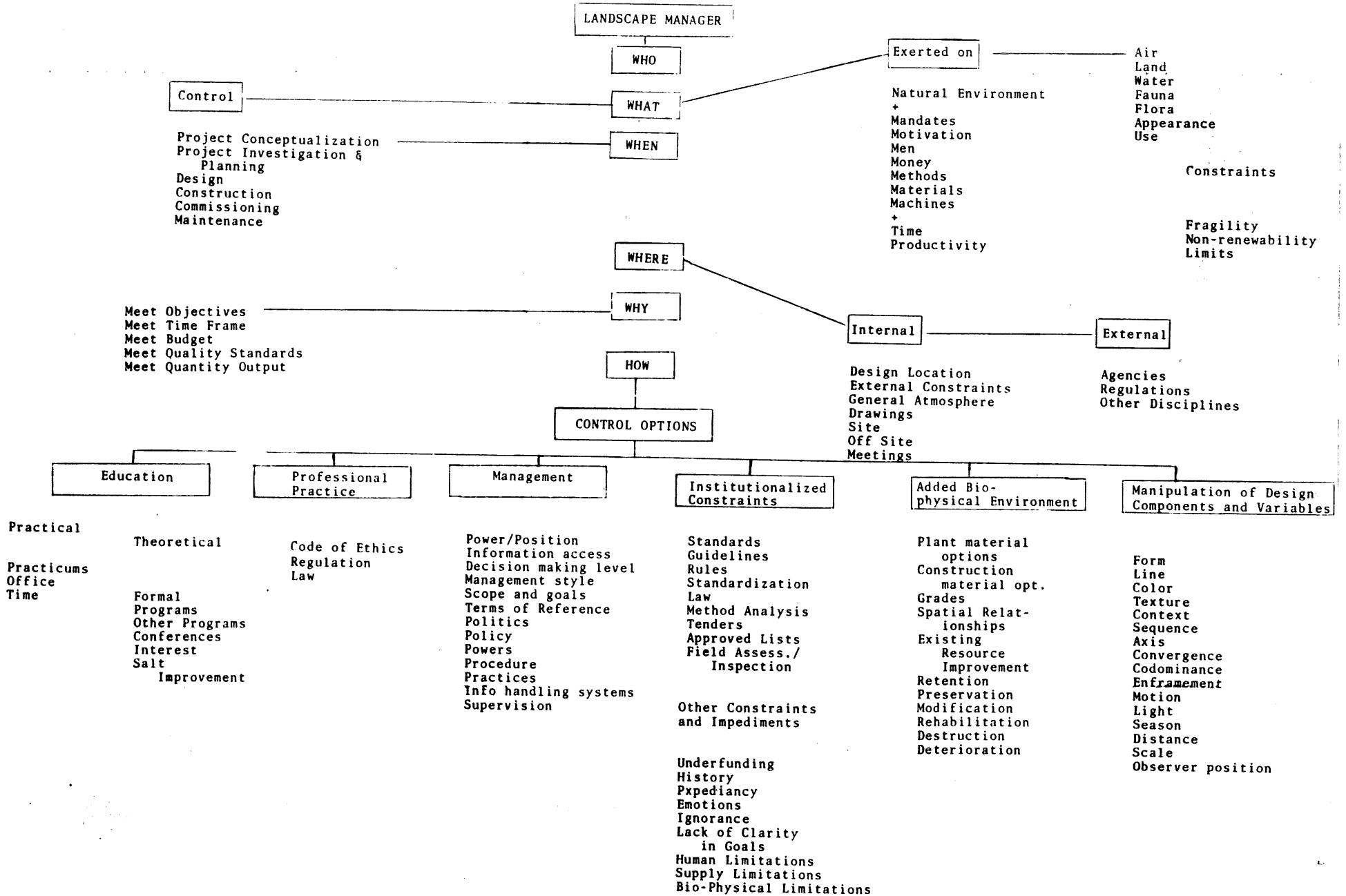
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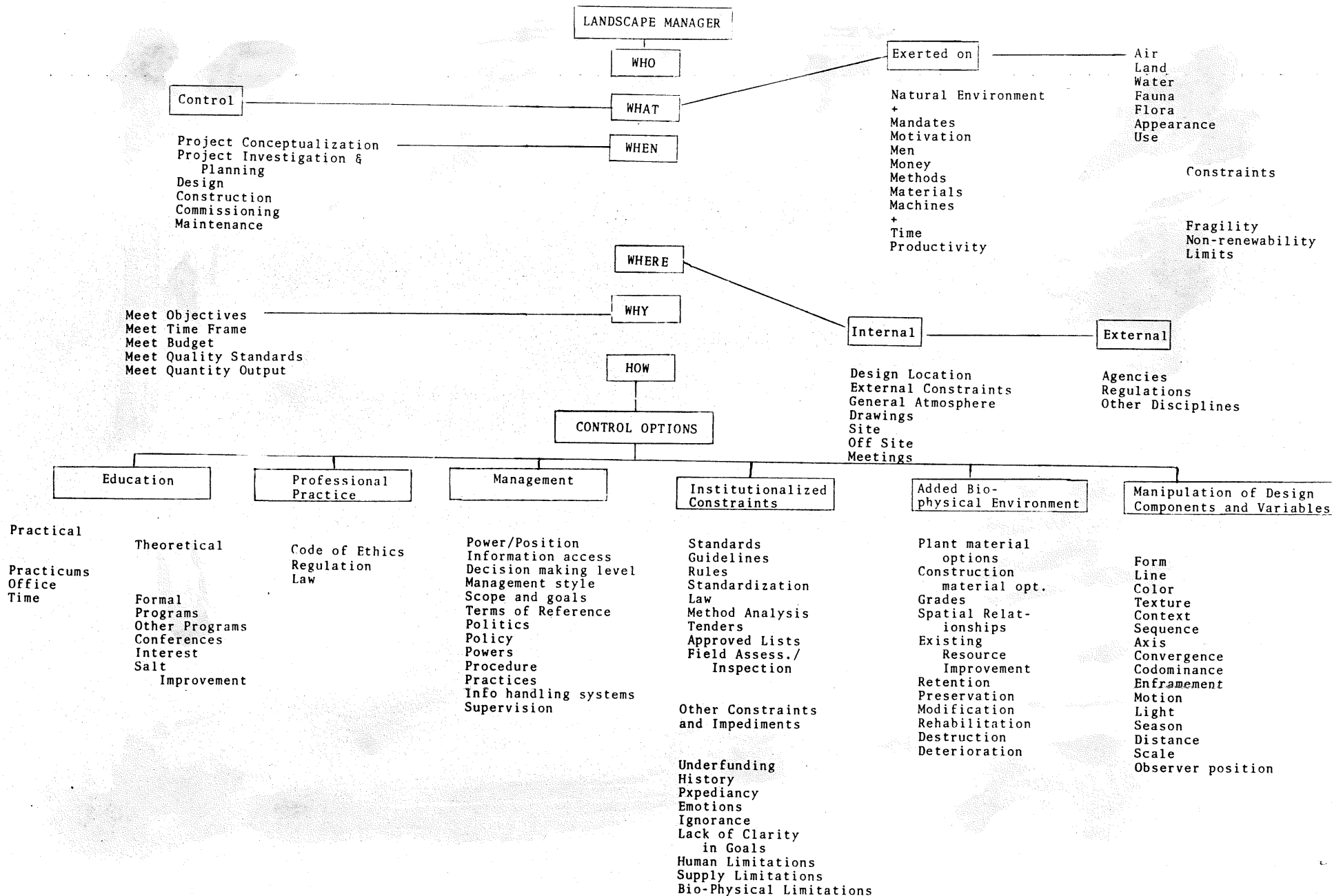
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